

THE
GEOGRAPHICAL
MAGAZINE

VOLUME VIII, NO. 3

ONE SHILLING MONTHLY

JANUARY 1939



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Harvest and Magic among the Kissi of Sierra Leone

by DR RALPH EBERL-ELBER

The eastern parts of the British Protectorate of Sierra Leone are seldom visited by Europeans, and it was their remoteness which led Dr Eberl-Elber, of Vienna, to undertake an ethnographical expedition thither. During his residence in this little-known corner of West Africa he had unusual opportunities for entering into the life of its native inhabitants

SIERRA LEONE, situated between the sources of the Niger and the coast of the Atlantic Ocean, is the oldest British territory in West Africa.

The first tracts of land, forming the Colony of Sierra Leone, were ceded by native chiefs in the year 1786 at the time of the emancipation of the West Indian negroes, and became a refuge for the liberated slaves. Later on the hinterland was explored and at the end of the last century the existing boundaries of Sierra Leone were defined. In the north and north-east Sierra Leone borders upon French Guinea; in the south-east it is bounded by the negro republic of Liberia. A relatively small part of the coast, the so-called Peninsula of Sierra Leone, is a British colony, whilst the rest of the coast and the whole hinterland form a Protectorate under British rule.

Although Sierra Leone can be reached by sea directly or by air via Bathurst in the Gambia, and in spite of the fact that a considerable part of the country inland has been opened up by two lines of narrow-gauge railway and several motor-roads, it is looked upon with disfavour by European colonists, mainly on account of its unhealthy climate. There are two main seasons: the rainy and the dry. The dry season usually begins in the second half of November and ends during the last weeks of April. At the beginning of May, or sometimes even sooner, the rains make their appearance as gentle showers; towards the end of the month heavy

thunderstorms, so-called tornados, occur, and immediately after them the tropical rainfall begins; in the following four months long, uninterrupted downpours submerge the land. Finally, in the first days of October the rains gradually decrease, falling only at night and during the early morning, and cease altogether about the end of November. Because of these long rains and the many discomforts of the dry season—unbearable heat, serious scarcity of water and, during December and January, winds that bring clouds of sand and dust from the Sahara and are a source of disease and danger to Europeans—because of all these, Sierra Leone was often in the past called ‘the white man’s grave’ and is shunned even today.

In physical character, Sierra Leone shows extraordinary variety. The coast is low-lying and in many parts very swampy. Innumerable rivers and streams form broad estuaries and quaggy winding creeks. Large areas of the southern part of the Protectorate consist of plains covered with virgin forest, whilst the centre of Sierra Leone is mountainous and the vegetation there is of a markedly different character: low bush and shrubs prevail, and on only a few hills are there patches of forest. Further eastwards, in the direction of French Guinea, even the bush disappears; the ground becomes rocky and, in the neighbourhood of the Djoliba, the main source of the Niger, gigantic mountains of bare granite rocks, devoid of vegetation, form an inhospitable wilderness where colonization has no chance to succeed.

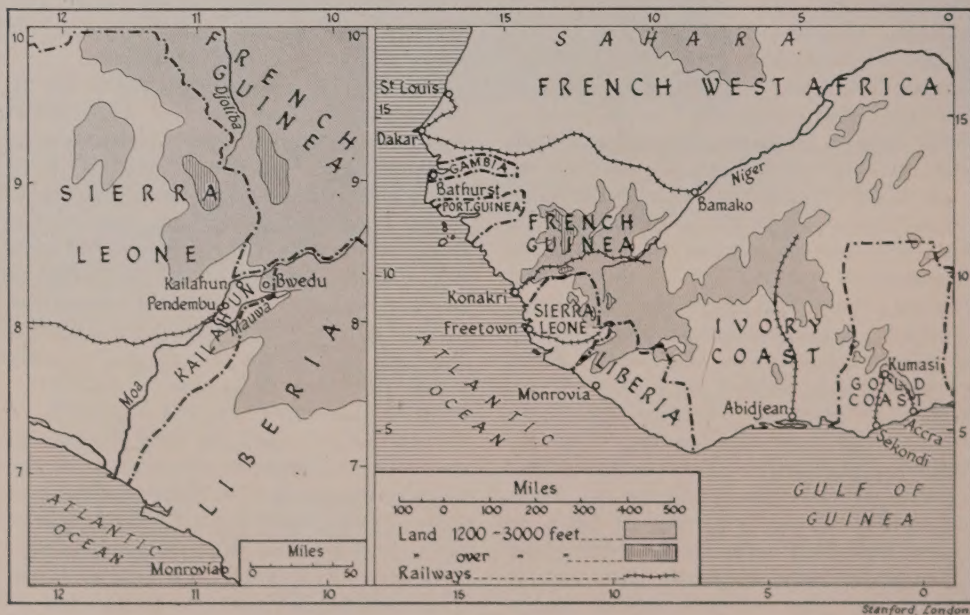
WHERE THREE COUNTRIES MEET

To this lonely, untrodden region the easternmost part of the Protectorate forms a striking contrast. Named after its chief town, Kailahun, it is situated between two big rivers, the Moa or Makona in the north, and the Mauwa in the south. It marks the spot where three boundaries meet: those of the British, the French and the negro republic of Liberia.

The southern and south-western parts of the district of Kailahun are bare and somewhat monotonous, and contain few hills; but in the direction of Liberia and French Guinea the hills grow higher and higher, becoming here and there real mountains. Many reach a height of 1100 feet, some of them even 1300 feet and more. Nearly all are covered with dense tropical vegetation; on the slopes grow big bushes and various kinds of spinous shrubs, and at the top forests with impenetrable undergrowth which offers shelter for bush rats, civet cats, hosts of monkeys and leopards. In some cases, however, the vegetation has disappeared, and the bare rock, exposed

to the heat of the tropical sun, the heavy rains of the wet season and the cold at night, is decomposing. Between these long ranges of hills, thickly wooded ridges, rugged pinnacles, crags and oddly shaped mountains, there are broad green valleys watered by fast-flowing rivers and by innumerable brooks which cascade down the slopes in a series of small waterfalls. It is a country of a peculiar charm. The soil in the valleys is the most fertile in the Protectorate, and the climate is the best in the whole of Sierra Leone.

About forty years ago it was difficult, sometimes even dangerous, to travel through the district between the Makona and the Mauwa. The native chiefs who ruled over the country were always quarrelling, and their warriors liked nothing so much as a fight; but for several years now the place has been quite peaceful. In the town of Kailahun a British District Commissioner was installed, and a road running southwards to Pendembu, the terminus of one of the narrow-gauge railways, opened up the country.





All photographs by Dr Ralph Eberl-Elber

The land of the Kissi lies among the mountains of the borderland between Sierra Leone, French Guinea and Liberia. In the well-watered valleys between the ranges the natives cultivate their crops

considerably. Nevertheless, the eastern parts of the district of Kailahun remain curiously remote and are seldom visited by European travellers.

During my journey through eastern Kailahun I was at first surprised to find that, although the most distant villages are only about twenty-five miles away from District Headquarters, many of the native people had never before seen a European. But in the process of roving about in every direction through this lonely country, I learned that no white colonist had ever settled there, and that it is far removed from European spheres of influence.

Although the eastern part of Kailahun is quite thickly populated, it differs from the southern and central districts of the Protectorate in that there are no big towns to be found. Very often it happened that I could find nowhere to stay for the night, because the village I had reached was so

small that the native chief was unable to allot me a hut. In such cases I was forced to continue my journey, even when I was hungry, thirsty and absolutely tired out, and try my luck in another village.

RICE : CORE OF KISSI LIFE

The native tribe inhabiting this corner of Kailahun, the Kissi people, differs greatly from all the neighbouring tribes. From the anthropological aspect this fact is of special interest. The Kissi are of less sturdy build than other West African negroes. Their women and girls in particular are often exceedingly slender and well-shaped; most of them have pretty faces, compared with the native women living in the virgin forests of the southern, or in the rocky wilderness of the eastern parts of the Protectorate.

In bygone times the Kissi people were

feared as being very warlike, but now, since the British authorities have stopped tribal wars, the Kissi have turned to a peasant life and, being energetic and diligent, they make good progress with agricultural work in spite of the difficulties they have to contend with. The staple crop in Sierra Leone is rice. There have been attempts to plant Guinea corn, but up to the present with little success. In preparing their rice-farms the natives have to work hard. First of all, large areas of the bush must be cleared for fields. After this, the wood that has been cut down is distributed all over the farm and set on fire. The resulting ashes are the only manure the natives can use to fertilize their fields, for most of them keep neither cattle, sheep, goats, nor pigs. The first rainfall, at the beginning of May, is the sign that the time has come to sow the rice. During the following weeks women and girls and boys are fully occupied in protecting the sprouting seed against birds, bush-rats and insects. Later on, in July and August, when the rice grows higher, the struggle with rice-eating pests is intensified, and when, at the end of September, the fields are ripening for harvest, they must be watched day and night. But in spite of vigilance, a good deal of the crop is plundered by birds which in some years invade the farms in such big flocks that the natives are quite unable to get rid of them.

The damage done by rice-eating birds may cause a real catastrophe and lead to extreme scarcity of the staple food, or even to famine, during the whole of the following year. Knowing this, the natives do their best to begin reaping the rice early and to bring the crop in as fast as possible.

During my travels I had more than one opportunity of observing the Kissi people harvesting the rice. On the smaller farms, belonging to one native family, the harvesting was done by women and girls only. In spite of the fact that the work was very wearying all of them were happy

and joyful, and nobody seemed to be tired. Kissi women and children, although delicate-limbed, possess astonishing physical stamina and are blessed with a cheerful temperament even when working so hard.

Knowing neither scythes nor sickles, the natives cut the rice, ear by ear, with small curved knives made by native blacksmiths. The cut ears, each on a long stem, are gathered into bunches; these are bound with strips of palm-leaf fibre and at first piled up in heaps here and there on the farm. Later, the bundled rice is taken home to the village and stored in granaries. The first thing which struck me as I watched the harvesting work was that the labour was well organized; the second, that women and children alike worked almost incessantly from early morning till night-fall. On each rice-farm the work was superintended by the head-woman of the family.

MAGIC HELPS THE HARVEST

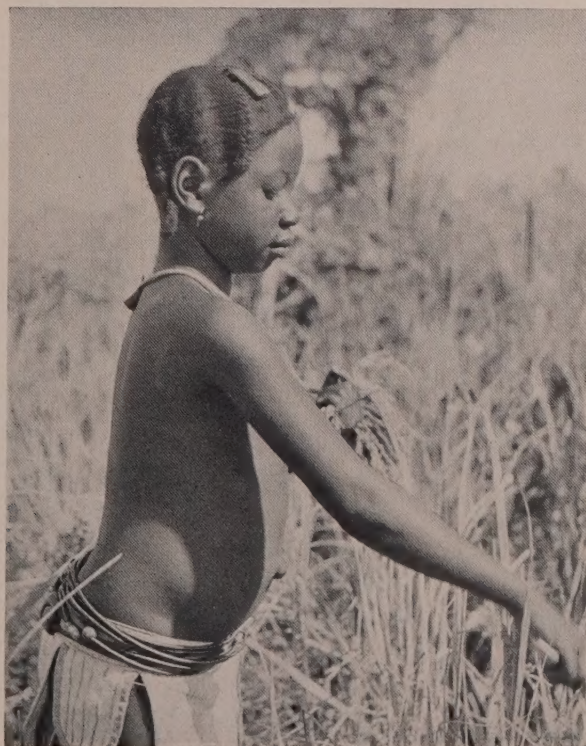
Superstitious as West African natives are in all the circumstances of their daily life, during harvest time they are to an unusual degree in fear of malignant spirits. In order to propitiate envious demons the natives offer as a sacrifice some fowls and the first bunches of the harvested rice. In addition they fasten medicine charms on a Baobab tree near the rice-farm, and the head-woman of each family, who leads the work, paints her forehead, temples, nose and cheeks very carefully with white clay in order to dissimulate her human origin and in this way keep off the malignancy of the demons.

When I was still on the rice-farms, studying harvesting customs, messengers from the Paramount Chief of Bwedu, the biggest chief of the Kissi country, came to inform me that there would be special harvesting activities in the next few days on the Paramount Chief's huge farms. They omitted to tell me the nature of the proceedings, but emphasized that the



Graceful and delicate-limbed, the Kissi women order family life and work in dignified routine. When the men have finished, women and children begin their meal of rice—

—which is both staple food and staple crop. Beneath her girdles, this little harvester is wearing a primitive garment called a yegbeyegbegi. In the plaits of her coiffure she has fastened small leather amulets





During harvest time the superstitious Kissi go in constant terror of malignant demons. The head-woman of each family, who leads the harvest, paints her forehead, temples, nose and cheeks with white clay to dissimulate her human origin and keep the evil spirits at bay

Demons that cannot be warded off may at least be soothed and propitiated. For this purpose the Kissi prepare a multitude of charms and offerings, among the latter being sweet potato and cassava roots laid on simple stands. (In the background is a stack of harvested rice)



Paramount Chief was anxious to see me and that he was convinced the events on his farms would be of the greatest interest to me.

I therefore determined to start immediately. The Paramount Chief sent me a hammock and eight carriers. Thus, for the first time in the course of my journey through the Protectorate, I rode in a hammock. We followed a narrow track running along a broad valley. After half an hour or so the path began to rise, and we reached a sparsely wooded ridge. Beyond was a range of mountains running from north to south. The slopes of these mountains were covered with large rice-farms belonging to the Paramount Chief of Bwedu. In the centre, on the highest ground, was a large clearing in the middle of which stood a big farm-hut; here the harvested rice was heaped in stacks. In and round the hut a crowd of women and girls were scattering the new rice on outspread mats for drying, amid cheerful chattering, shouting and singing, accompanied by the rhythmical boom-boom of the long heavy pestles with which one group of girls was pounding rice in big wooden mortars. Another group was about to cook large quantities of the pounded rice for the mass of labourers and servants working in the fields.

I was told by one of the head-men, who came round to the hut in order to act as guide, that there were about three hundred men and nearly a hundred and fifty women in the service of the Paramount Chief. And yet this enormous number of labourers had proved quite insufficient for gathering the harvest in time. Therefore the Paramount Chief, fearing the depredations of rice-eating birds, had summoned to his farms two medicine men belonging to the 'Ngufui society', a peculiar secret society well known in the most easterly district of Sierra Leone and the neighbouring territories of French Guinea and Liberia.

Each of the medicine men had come

with a couple of assistants and a band of drummers. Members of the so-called Ngufui society possess a secret medicine, the sap of certain plants, which enormously increases physical energy. Before the medicine men and their helpmates start working, they make a long cut on their fore-arms, allow a considerable quantity of the stimulating drug to trickle into the gash, and then bandage the arms tightly with long strips of cloth.

In a few minutes the sap produces an astonishing effect. I myself have watched one of the medicine men injecting this marvellous fluid into his fore-arm, and only ten minutes or so had gone by when he began working in great haste with queer movements of his whole body. At first he acted like a manikin, cutting the rice faster and faster, then suddenly



Besides these aids to a successful harvest, the services of medicine men belonging to a special society are enlisted to expedite the work

Harvested rice being brought into the Paramount Chief's compound for storage in his granaries. Carefully bound together in bunches, the rice-panicles are carried on the head in large baskets—



—or on the back in hampers made of bamboo-sticks and palm-leaves. This is heavy work for men. Later the rice is winnowed by the women with basket-work fans and spread on mats to dry before being pounded ready for cooking



With a happy smile a Kissi girl displays the fan used for winnowing the rice

began to jump about the farm in short leaps, shouting and singing, twisting his body and shaking his head with sharp jerks. All the time he never paused: first he cut single ears, then, intensifying his actions, he snatched ten and twelve panicles at once and, finally, infuriated by the stimulant in his body, he grasped big bundles of rice and cut them with a single stroke of his knife. His helpmates followed, all the time competing with him. It was really surprising to see what enormous quantities of rice this medicine man and his assistants could reap in a little time. Without doubt each of them achieved more than four or five strong labourers, and went on doing so for hours and hours. Only now and then they sat

down for a short rest, the next moment to begin moving on again, jumping more hastily and increasing their labour in frantic orgies.

The effect of this almost magic work done by the medicine men of the Ngufui society is twofold. No doubt, mad as their behaviour and that of their satellites might seem to a stranger, they do good work. But apart from that they incite all the other labourers to work at full speed, encouraging them so that they do not relax in spite of the tropical heat, which day by day becomes more and more unbearable. Men and women alike are stimulated by the exciting rhythm of the medicine men's drums and their wild, impassioned songs to continue the work, even when they are tired to death.

THE LAST SECRET SOCIETY

The influence which the medicine men of the Ngufui society have over the harvesters has nothing to do with any kind of force or compulsion. What incites and encourages the workers to such a degree is their faith in the supernatural powers of the medicine men. Superstitious ideas about the possibility of imbibing magic powers through 'secret medicines', play a large part in the lives of all West African natives, and no doubt in the lives of the Kissi as well. These 'bush medicines' are based largely on concoctions in which certain plants and roots as well as parts of animals are used. 'Medicine making' is one of the oldest and most deeply rooted traditions in the Kissi country, and is closely connected with the so-called 'secret societies'. These West African secret societies used to have a most evil reputation. There are many rumours about surreptitious meetings and licentious orgies taking place in remote forests. It is even whispered here and there that the savage rites of these societies are very often the cause of murders.

The fact is that in former days there were many very different 'religious so-



The costume worn by a high-ranking medicine man of the Poro secret society includes an otter-skin mitre and tinkling iron leg-rattles



In order to impress people with its supernatural power and to personify demons, the Poro society has created various masks, one of which is 'Gbini', a fabulous creature of the forests

cieties' in Sierra Leone, and it happened sometimes that men were killed and their blood and bowels used for 'making magic medicines'. But for a long time the British authorities have been successful in stopping this cruel custom: today all the 'cannibalistic' societies are extinct, and there remains in existence only one society of any importance, the 'Poro'.

The Poro is a wide-spread society comprising almost all the men living in Sierra Leone. Its power is based on the absolute secrecy of all its members. If anyone were so depraved as to leave the society and, in spite of his vow of secrecy, to betray anything about its laws and cus-

toms, sooner or later unnatural death would overtake him.

The meetings of the Poro members are always held in the bush, in a spot hidden by the densest tropical forest and almost inaccessible because of broad streams and deep swamps. No one not initiated into the society is allowed to enter these secret places except by special invitation of a *Mahã*, a Paramount Chief, or by permission of a medicine man of high rank.

On the Poro all social life is based. It represents tribal law; there is a special court of justice, and without asking the Poro nothing of importance is undertaken



'Nyanghai', representing a legendary demon-busheat, is the only mask of supposedly female sex

by the natives. Even the education of boys is in the Poro's hands.

DEVILS LEAD THE DANCE

To represent the supernatural power of the Poro, various masks have been created; 'Poro devils' the Europeans commonly call these peculiar and sometimes grotesque figures. The natives believe that these masks not only imitate demons, but materialize and personify the supernatural beings in all their magic powers.

Throughout my travels in central and eastern Sierra Leone, I never had a chance of seeing one of these Poro masks. Amongst tribes who have for some time been under the influence of Islam, the Poro masks have lost a good deal of their magical significance and most of them have disappeared. But later on, as I proceeded up country and came to the district of Kailahun and the Kissi country, I was luckier. Near the town of Kailahun a Poro devil made his appearance one evening accompanied by a band of drummers. The native people called him 'Yubai'. He was shaped like a big bell made of palm-leaf fibre. The man hidden under this mask has to perform all his movements and his ritual dances in a cowering position for several hours without interruption. I was told by an old medicine man with whom I became friendly that few people can stand such a strain without falling in a faint. If someone has such a misfortune he is at once dismissed, and is never again allowed to put on a mask or to represent a demon.

It is proof of the highly developed imagination and rich inventiveness of the natives that another Poro mask, which is found in the virgin forests of the boundary between the Kissi country and Liberia, shows a completely different shape. This mask, named 'Landa', is characterized by a big wooden head topped with a crown of the feathers of the Turaco. The face has weird features and its big, round, white-painted eyes look out gloomily. The

enormous mouth is full of sharp-pointed teeth dyed red and resembles the jaws of an alligator. By 'mysterious' mechanism the wearer of the mask may open and shut its terrifying mouth.

The Landa is believed to represent the first great king of the tribes of the remotest parts of Sierra Leone and, moreover, the mask is supposed to materialize the 'Big Bush Ghost', a spirit which, the natives believe, lives in the dense forests and rules over mankind. The man who acts inside the Landa mask is a Poro member of high rank, protected by a powerful medicine. If such a man dies, he must not be interred in a town or near a village, but in a secret place in the bush. Before the dead body is carried out of town, all women and children have to withdraw into the houses, and are compelled by a very severe Poro law to remain there



Bands of drummers accompany the Poro masks or devils in their ritual dances. One type of small drum is beaten with a curved drumstick



With his round, white eyes, enormous alligator jaws and feather-crowned wooden head, 'Landa' is the most grotesque and terrifying of all the masks

until the booming of big drums announces that the burial is over.

The Landa mask, perhaps the most terrifying of all Poro masks, plays an important rôle at the initiation of new members into the society. It is supposed that the initiation candidates are swallowed by the Landa and, after a certain time, are re-born of him and given back to the world as adult and full-grown men.

Although the sex of the masks is not specially indicated, it is always believed that the masks of the Poro, the secret society of men, are male. But there is

one exception. While I was staying in a small Kissi village I saw a magnificent mask named by the natives 'Nyangbai'. The word Nyangbai means a legendary wild bush-cat, and a medicine man told me that a powerful demon inhabits this species of bush-cat. The Nyangbai mask which personifies the bush-cat demon passes for a creature of female sex in the imagination of the natives.

During my residence in the western parts of the Kissi country I saw one day a ritual performance by a big, clumsy mask, called 'Gbini'. This mask, personifying a fabulous creature supposed to have only one eye and to be exceedingly malignant and extremely dangerous, is very passionately worshipped by the natives. Before the performance began the scene of action had to be cleaned with great care. Every twig and leaf was swept up by a dozen of the medicine men's assistants; every stone was removed, and a special medicine man drove away all animals. If the place were not perfectly clean and tidy the natives feared that the demon represented by the Gbini would be offended and might take a cruel revenge.

Superstitious as the Kissi people may be, there are yet many good qualities and a great deal of common sense to be found amongst them. Both men and women like their daily work, and everyone is pleased to have the opportunity of augmenting his goods and chattels. And since the British Protectorate has brought to the Kissi people peace from tribal wars and slave-trading, their country, although aloof and often forgotten, begins to prosper and is on the way to becoming one of the happiest and most attractive places in the whole of Sierra Leone.

Monemvasia: The ‘Gibraltar of Greece’

by P. B. DE JONGH

One of the few figures of English history who, by the strange manner of his death, makes an ineffaceable impression upon the schoolboy's mind is that Duke of Clarence who was 'drowned in a butt of Malmsey wine'. Where or what 'Malmsey' may have been, the schoolboy is not told; and most English readers will be surprised to learn, from the following article, how great a name was Monemvasia in the chronicles of mediaeval Greece

FROM Sparta, in the south of the Peloponnesus, a long and dusty road leads through the remote plains of Helos and Sikia, by lonely hills and sparse villages to the eastern coast of Cape Malea.

As our car wound along the coastline road, empty of all traffic, the country seemed arid and desolate after the rich valleys of Sparta which we had left behind in the morning. It was about four o'clock in the afternoon when we rounded a little promontory and caught our first glimpse of the rock of Monemvasia (the famed Malmsey of our ancestors) jutting out into the sea. This extraordinary island, joined to the mainland by a narrow causeway (whence its name Monemvasia, ἡ μόνη ἔμβασις, the only entrance) stands out in a glittering landscape of yellow hills, covered in scrub, and indigo-blue sea, like some huge sprawling monster. But the sides of its cliffs are abrupt; except for a few clusters of yellow sea-poppies hardly any vegetation clings to those crude boulders, brick-red in colour. Only on the summit of the rock a rampart of ruined Venetian fortifications marks the site of the once impregnable fortress, and reminds one that in the port below the fleets of Byzance and Venice and the pirate vessels of Turkish and Catalan raiders—their pennons flying, the Lion of St Mark unfurling in the breeze—fought and struggled for five centuries for the possession of 'sacred Monemvasia'.

A cluster of a dozen houses on either side of the causeway, a dreary pub—there

is nothing else, not even a petrol pump. Twice a week a coastal steamer puts in at the port, drops a few letters, takes off some fish. From the pub a road, a quarter of a mile long, fringing the southern side of the island, leads to the gates of the walled city of Monemvasia, startling in its apparent completeness, its grey-bastioned remoteness, brooding over a long expanse of moving sea.

Two parallel lines of fortifications run down the length of the cliff from the fortress to the rampart along the sea-front, and within these walls lies the terraced city itself. Immediately outside



Stanford, London



All photographs by P. B. de Jonck

Joined to the mainland only by a narrow causeway, the great rock of Monemvasia squats upon the indigo-blue sea like a huge sprawling monster. Facing seawards—



— the decaying city lies within two walls running down from the ruined Venetian fortress

the walls there is not a single habitation.

We passed within a tunnel-like archway and found ourselves in a maze of narrow, winding streets, just wide enough to hold one man and a donkey abreast, amid a conglomeration of ruined Venetian doorways, mediaeval stairways, white-washed houses reminiscent of Cycladic architecture, and crumbling Byzantine churches. It was a miniature town, shut off from the rest of the world within its battlements, dreaming of—nothing at all.

The people appeared to be unintelligent and, unlike most Greek peasants, not particularly well-disposed. Our first impression of them was confirmed during the subsequent days which we spent in Monemvasia. The Monemvasiotes show no interest in any worldly or spiritual affairs, not even in the newspapers, which they hardly ever see. They cultivate no fields; they have no work. They only fish.

Thus have the convulsions of history allowed Monemvasia, the 'Gibraltar of Greece', to die gradually, along with its inhabitants, in a mild and painless dissolution.

In actual fact Monemvasia, built on the site of the ancient Minoa (dating as far back as the Minoan civilization), did not become an important trading or political centre until the commencement of Byzantine rule.

At the end of the 6th century A.D. the Emperor Maurice conferred special liberties upon the city, which was wisely ruled by three archons for several subsequent centuries. One of these three families, the Mamonas, is not yet extinct in Greece.

Owing to its impregnable situation, Monemvasia succeeded in resisting the Norman raiders who had besieged and laid waste Corinth, and soon established its position as the great trading centre of a much-prized wine known as Malmsey



The domes of its many crumbling Byzantine churches bear witness to long-vanished prosperity

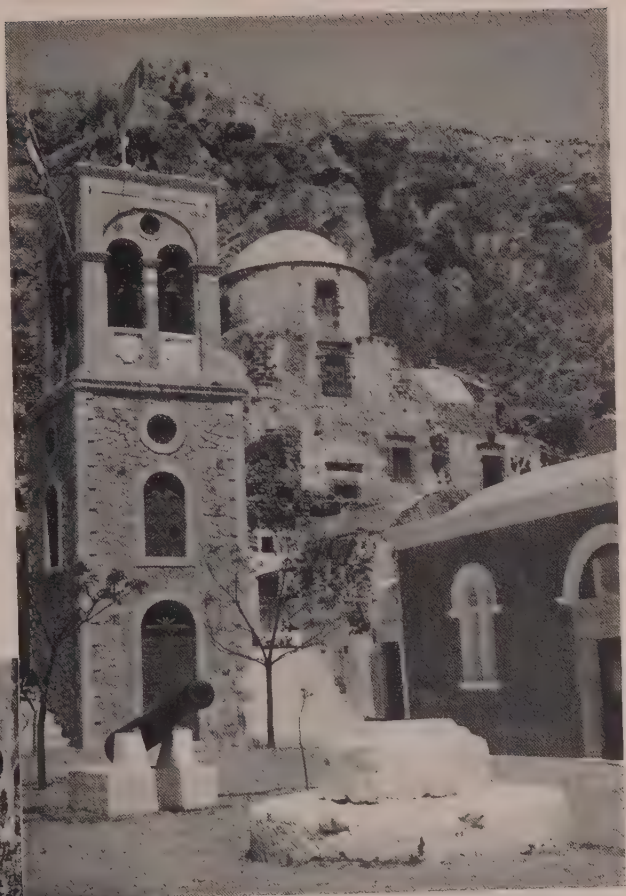


The town's high, white-washed houses scale the side of a steep cliff. Fishing appears to be the sole occupation of their bored and listless inhabitants



Few of the houses have such an air of neatness and prosperity as has this one, with its clean, dazzling walls reminiscent of Cycladic architecture

The church on the right of the principal square once contained an ikon of Christos Elkomenos ('Christ being dragged'), much admired by the Emperor Isaac II



Not the narrowest, but the widest thoroughfare in Monemvasia—a typically dark, dank and tortuous street, lined with butchers' shops and dingy houses

or Malvoisie. The vines were cultivated in the surrounding country and in the Cyclades, especially Tinos; but Monemvasia was the emporium of the wine trade.

Even in 1205, after the Fourth Crusade had passed across the Levant, and when the Frankish conquest of the Peloponnesus was almost complete, Monemvasia, along with Corinth, Argos and Nauplia, resisted the invaders. But the fall of Corinth in 1210 was soon followed by the surrender of Argos and Nauplia. Monemvasia thus remained the last stronghold of Hellenism in the Peloponnesus, until in 1248 William de Villehardouin reduced the city by means of famine, after a siege of three years.

Ten years later the Greeks began to recover lost ground and the artificial Latin Empire created at Constantinople collapsed in 1261. William de Villehardouin, who ruled over the Peloponnesus in feudal grandeur, had been captured by the victorious Greeks at the battle of Pelagonia. As a part of his ransom he was compelled to cede Monemvasia to the Byzantine Emperor Michael VIII. The Latins (who from the Greek standpoint included both Franks and Venetians) nevertheless retained their hold in Attica, in the Cyclades and in the Peloponnesus, except for the province of Laconia.

With the renewal of Byzantine rule, Monemvasia, which had resisted the invaders so heroically, grew vastly in political and commercial importance, and as the port of shipment for Malmsey wine it naturally attracted numbers of plundering corsairs. The Emperor Michael VIII granted the city fiscal exemptions, confirmed again by Andronicus II (1282-1328) and Andronicus III (1328-1341).

Monemvasia had gained illustrious renown for its citizens; stories of their strength and heroism in resisting sieges, of their patriotism and *esprit de corps*, spread throughout the country. According to the laws of the city (maintained by the general will of the people) when a citizen died

without any relatives, the proceeds of his estate were handed over to the municipality for the upkeep and repair of the castle; and if he had only distant relatives, one-third of his estate was reserved for that purpose.

After the fall of the Byzantine Empire in 1453, the Monemvasiotes, rather than hand their 'sacred city' over to the armies of the Sultan, placed themselves under the protection of Pope Pius II; but they soon wearied of papal rule, and in 1464 they made overtures to the Venetian Republic, well-known for its tolerance and lack of religious bigotry. Accordingly a Venetian *podestà* was installed at Monemvasia, and the city was henceforth known as *Napoli di Malvasia*.

Throughout the first half of the 16th century, the Venetian colonies in the Peloponnesus—Coron, Moden, Navarino—were falling to the Sultan. Finally, in 1540, Monemvasia too was compelled to surrender. In November of that year a Venetian fleet carried off the soldiers and artillery from the sacred rock, and all the inhabitants who wished to leave were offered lands in other parts of the Republic. The keys of the city were handed over to Kassim Pasha and the Crescent at last waved unchallenged over the historic fortress.

The Venetians apportioned lands to the Monemvasiotes in Crete, Corfu, Cyprus, Santorin and Dalmatia. As they left their homes, the Greeks tore up the vines and, it has been suggested, carried them away to Santorin in the Cyclades. A sweet and heady wine, which is supposed to be not unlike the ancient Malmsey, is produced in that island today.

Nevertheless, a number of Monemvasiotes, especially those who had emigrated to Corfu, grew homesick and returned to Monemvasia to become Turkish subjects. Their descendants, no doubt, are those few impoverished families who dwell in isolation and ignorance on the rock today.



On the summit of the rock, which resisted so many heroic sieges, are the remains of the Venetian fortress



Among later buildings that are derelict and weed-grown, one still remains erect—the 14th-century Byzantine church of St Sophia, poised on a precipitous cliff 300 feet above the sea



The church of the Chrysaphitissa commemorates the miracle of the ikon of the Virgin which, according to legend, persistently flew during the night from Chrysapha to Monemvasia

There followed a brief second period of Venetian rule, when Cornaro in 1690 wrested Monemvasia from the Turks; but this interlude only lasted until 1715. For another hundred years the hand of the Turk lay heavy on all the Greek lands. When the War of Independence broke out in 1821, Monemvasia was the first fortress to be taken by the Greeks, and in the following year it became the seat of the first National Assembly.

Nothing remains today of Monemvasia's ancient glory except the great fortifications and the ruins of churches. As we wandered through the tortuous streets darkness fell on the sea. There is no electric light in the fortified village, no inn, no sleeping-quarters—the people had disappeared from the streets. Occasionally the dim light of a tallow candle illumined the interior of some dingy habitation.

We returned to the causeway and dined

in a dark tavern, owned by an enormously fat man who laughed so loudly and immoderately that he shook the frail beams of his house. He was assisted by a bright twelve-year-old boy who smiled and rubbed his hands continually, and whose greatest ambition, we were told, was to become a *servitoro* in an Athenian restaurant. But he only 'served' us with fish and black bread. Olives, potatoes, tomatoes, cheese—all the staple products of the Greek countryside—are nowhere to be found in Monemvasia.

On the following day Monemvasia suddenly sprang to life. It was the eve of a great religious festival, one of the few truly devout and uncommercialized religious festivals in the Peloponnesus. According to an 18th-century legend, a certain ikon of the Virgin contained in a church at Chrysapha, near Sparta, used to fly during the night from Chrysapha to

Monemvasia, where it would be found in the morning perched on the branch of a fig tree. The people of Chrysapha accused the Monemvasiotes of stealing the ikon, and carried it back to their church. But soon afterwards the ikon renewed its nocturnal flights across the mountains of Laconia, and a long struggle ensued between the people of Chrysapha and Monemvasia for the possession of it. Finally, the Monemvasiotes were allowed to keep it, and a new church was erected, to commemorate the miracle, on the spot where the ikon used to be found in the mornings. An adjoining shrine contains the precious image itself.

Throughout the day an endless caravan of mules, bearing pilgrims from all parts of Laconia, crossed the causeway and encamped for the night in the spacious square in which the church is situated,

above the ramparts overlooking the sea. Deformed beggars were ranged along the road leading to the entrance into the town, crying out pathetically in a high, rhythmic drone: "Help me, oh children, help me!" Towards evening, too, an endless stream of buses and cars rattled across the bridge and dumped hundreds of peasants on the bare slopes outside the walls of the city. Penny-whistles, sweets and Turkish Delight were being sold by pedlars in the narrow streets and in the square adjoining the church.

The following morning a service, delivered by the Bishop of Sparta, who had come to Monemvasia specially for the occasion, was held in the Church of the Chrysaphitissa. A huge crowd overflowed from the hideous, chocolate-coloured church into the baking, unshaded square. Three



Once a year pilgrims, peasants and beggars throng the little town to attend the religious festival, during which a procession parades the aeronautical ikon through the streets

ropes, representing the girdles of the Virgin, were looped round the walls of the Church, and a pilgrim who chose to kiss one of the ropes could beseech the Virgin to cure him of any particular malady from which he might be suffering. If the cure was then effected he had to present the Virgin with a girdle. He could also kiss the three ropes and make three separate entreaties on the tacit understanding that he would then offer three girdles instead of one!

After the delivery of the service the miraculous ikon was paraded through the streets of the village, at the head of a procession comprised of the Bishop, priests in magnificent gold and green robes, and a phalanx of small boys tottering under the weight of enormous banners. Reaching the outer walls, so that those encamped outside the city might have a chance of seeing the ikon, the procession then returned to the church and the crowds slowly began to dissolve.

We saw the Bishop of Sparta retire into a private house, emerge a little later in his ordinary black robes and climb into an old Ford car which conveyed him back to Sparta. Some of the minor clerics, however, we found in the café (formerly a Turkish mosque) smoking and drinking coffee.

The pilgrims were dispersing hurriedly and by midday, as the rising wind swirled clouds of stinging dust through the streets and along the bleak hillside, a trailing caravan of donkeys and women and children could be seen marching back across the causeway

towards the villages and mountains of Laconia.

In the afternoon, our last afternoon in Monemvasia, we climbed up to the fortress, built by the Venetians in the 16th century on the summit of the rock. A thick growth of weeds and thistles, two or three feet high, has cluttered up the paths intersecting the summit of the plateau. These weeds have grown over and strangled the walls of Venetian houses, hiding the water-wells and cisterns. Alone the Byzantine Church of St Sophia, founded by the Emperor Andronicus II in the early 14th century, stands erect today, on a precipitous cliff with a drop of three hundred feet sheer to the sea below.

There is nothing but desolation in the scene: the crumbling fortifications, patterned with long shoots of ivy, the foundations of houses buried in beds of stinging nettles; below, the grey walled city, with its decayed churches and turreted bastions; around the island and along the coastline the white-capped waves gurgling and breaking on the rocks.

A young man of seventeen conducted us round, explaining and pointing out the historic sites. But imagination was stultified—one could feel so little of the clash of Byzantine, Venetian and Turkish arms in this remote solitude, with the people asleep in the village below and only the gulls squawking in the wind-lashed air. So, for all its memories of grim sieges, pirate fleets and mediaeval chivalry, we knew then that we should only remember Monemvasia as a dead and mutilated image of an illustrious page of history.



Photograph by Phyllis Kel

‘ The mouse that always trusts to one poor hole, Can never be a mouse of any soul ’



Photograph by John Marcum

Seldom seen or heard are the timid wood-mice, yet sometimes they join forces with—
—the tiny voles, and devastate the country as remorselessly as a plague of locusts

Photograph by Phyllis Kellay





Photograph by G. B. Kearey, F.

When a 'little gentleman in black velvet' tripped and killed William III with a mole-hill
—the hedgehog was probably asleep, curled in a spiky and impregnable ball for the winter.

Photograph by Eric J. Hosking, F.





Photograph by Phyllis Kelway

Most agile, most impertinent and most charming of all woodland creatures is the red squirrel



Photograph by Frances E.

Lucky it is for all tree-top denizens that the nimble pine marten is now nearly extinct—
—though the polecat, who seeks his prey mostly on the ground, is believed to be increasing

Photograph by Arthur Bro





Photograph by Frances Pitt

Fur and feather alike are a tasty meal to bold Reynard, fleet of foot and sharp of wit

The playful otter is an awkward landsman, more at home in the mill-pool and the stream

Photograph by Frances Pitt





Photograph by Arthur Bro

Strength and shyness characterize the badger, a night-time prowler who loves his wooded solitude



Photograph by G. B. Kearey, F.R.P.S.

The Monarch of the Glen has been native to these islands since time unchronicled—

—unlike the fallow deer, ornament of our parks, whom the Romans probably introduced

Photograph by G. B. Kearey, F.R.P.S.



People of the Hadhramaut. II

by FREYA STARK

Continuing the series of character sketches published in our December issue, Miss Stark turns from the women and children of the Hadhramaut to the men. Alone on her first visit in 1936, she made a part of her second trip, this year, in the company of two lady scientists. Their experiences will be fully described in a book to be published by John Murray. Meanwhile Seen in the Hadhramaut, just published, offers a vivid picture of the country and a collection of Miss Stark's best photographs

THERE is a great pleasure in seeing the creature man at his best and untrammelled, as far as possible, by material things. This one can do nowhere better than among the South Arabian beduin who, with so little in the world that you may almost call it nothing, yet manage so to develop their bodies and souls and minds that the sight of them is a constant delight and their conversation generally a pleasure.

The fact is, I imagine, that the inventions of other people tend to put our brains to sleep; it is our own which vivify, and Mr Wells is probably right when he says that there was no age so intellectually active as the Neolithic, when the great foundations of civilization were laid.

It is a never-failing delight to me to see how many things a beduin can do without. He can eliminate the cooking-pot by spreading his chunks of meat on heated slabs, and excellent they are. The salt he grinds between two stones; his water-supply he carries in the skin of the animal he has slain, after rubbing it with pebbles and the juice of the 'ishr tree to do away with the hairyness inside. All he needs in this world is a knife, a needle to sew his goatskins, a flint for fire, and the luxury of a cotton shawl which keeps him warm or cool as the case may be and serves as a storehouse for the small provisions he ties into its various corners. He also uses it for fishing. He spreads a few crumbs inside it, or even tiny pebbles, since the stupidity of Arabian fish can be relied on; and then, with the whole lowered in the water and a friend to hold the two farther corners—waits, for he has nothing in this

world to hurry him. And when there is a sufficiency of fish above the square of the submerged shawl, he lifts it quickly and finds his catch in the middle. The Hadhramaut, just below the lip of the plateau, or Jöl, is full of these isolated pools embedded in limestone. But how the fish ever get into them in the first place is one of those mysteries which even my friend the geologist was unable to explain.

I imagine that this cleverness in dealing with the problems of life is common to all parts of the world and to all primitive races; but it must be rare if not unique to find anyone as intellectually advanced as the Arab practising it. Sitting there, in the shadow of a great rock, through the hot hours, he will invent or recite his poetry, discuss the politics that come within his ken, speculate on the phenomena of nature or the End of Man with a lively and unembarrassed mind: and I have often thought that he has in him something of the vigour which Greek shepherds must have had before the great days of Hellas—all doomed to come to nothing since, amid all his gifts, curiosity, that divinest one of all, has been omitted.

One great advantage the beduin has derived from civilization, and that is his gun. He looks upon it as chiefly useful against his neighbours, but it has also added to the pleasure of his life by making the hunting of ibex and gazelle more possible, and a tuft of ibex hair killed by himself nearly always decorates the butt. The butt is covered by a piece of wood, rounded and flattened like a ball that has been punched and cut in half, and for a



(Above) 'One great advantage the beduin has derived from civilization, and that is his gun', often a strange patchwork of parts. Below' The beduin uses his cotton shawl for fishing. 'He spreads a few crumbs inside it . . . waits . . . lifts it quickly and finds his catch in the middle'





All photographs by Freya Stark

'The beduin . . . manage so to develop their bodies . . . that the sight of them is a constant delight'



Hadhrami masons produce elegant decorative effects with the aid of mud, straw, lime and sugar

long time I puzzled over this until it dawned upon me that it is meant to protect the naked shoulder when the thing goes off. That is the only explanation I can imagine for this addition which is general wherever I have travelled in South Arabia. The northern Arabs do not use it as far as I know, nor would they need it since their shoulders are not naked.

There is a great difference between the intelligence of the beduin and that of the Hadhramaut peasant, whose mind is pedestrian, and the purity of his race much mixed with African slave blood. But I think it is less this than the actual influence of his labours which makes him dull, for he has the slowness which belongs to the peasant the world over. It is very different when one comes among the artisans, and I imagine that there are no masons in the world so clever as the Hadhramis, except possibly the Italians. The whole of the material they work with consists of mud and straw, with the addition of lime and sugar for the decorative parts; and with this they have evolved an architecture of unsurpassed dignity and beauty. In the matter of ornament, they can tackle almost any problem, and will, alas, produce with equal ease a classic pediment or a Batavian turret against the severe background of the Jöl. The sugar, mixed with lime and smoothed with a wooden plane, gives a shiny surface like distemper to their interior decoration, which they combine with delicate stucco-like effects carved in mud.

Yet here again, curiosity is absent from the Arab mind, for they have evolved hardly any industry of their own: they are content with the rough potteries their pre-Islamic ancestors once used; their weaving is negligible, and they produce practically nothing else except the beautiful carving of their doors. This is pure laziness, for if they wished they could use their minds in almost any direction. When we had a broken watch I asked rather despondently if there was anyone in the village who

could do something about it. A charming old philosopher called Abdulla appeared and set it right. He had learnt how to deal with watches, during a two years' pilgrimage to Mecca, from a Sayyid to whom, Abdulla explained, the art had come, not through study or apprenticeship in a watch-maker's shop, but of itself through 'the blessing of God'. The remarkable fact is that our old man's second-hand inspiration was actually able to make the watch go.

This laziness of the town Arabs is not inertia, but is, like that of the beduin, merely a love of variety and a dislike for the dullness of routine. And that, I imagine, is why they prefer beyond other occupations the adventures of commerce or travel or war.

They have a pleasantly democratic outlook on the world and do not consider that what a man happens to be *doing* interferes with what he *is*: Gasim, our cook, was the son of a small headman in Yemen and the fact that he cooked our dinners did not prevent him from being generally considered our social equal if not superior, hampered as we were by the inescapable inferiority of our sex. I think that my scientific companions never quite realized that they were considered socially inferior to the cook, and he himself took it too naturally ever to be elated by this obvious fact. He was rather a dandy in his way, and can be seen here, very well dressed, sitting on the doorstep of his kitchen beside the son of one of the leading Elders of our town.

Some professions are however definitely outside the pale, and of such are the strolling jugglers and singers who also came from Yemen. They, when they join in the general circle of society which is open to all, remain at its outer edge. Their labours are not to be confounded with the art of Poetry, which is the noblest of arts and fit for anyone to practise.

When at a loss, and in possession of

A pleasantly democratic outlook is characteristic of the Hadhramaut. Trade has ever been held in honour, and the brother of so exalted a personage as the Mansab or religious Head of a town—



—may be a small shopkeeper dealing in groceries, dried fish, salt, charcoal, paraffin and other household luxuries and necessities, who spends his days in contented contemplation beside his wares





Some professions are however definitely outside the pale, and of such are the strolling jugglers from the Yemen. They, patiently awaiting calls on their services, remain at the outer edge of the social circle—



—unlike their fellow-Yemeni, the author's cook, who thought himself her social superior and consorted, resplendent in turban and white duck coat, with scions of the best families in the Hadhramaut



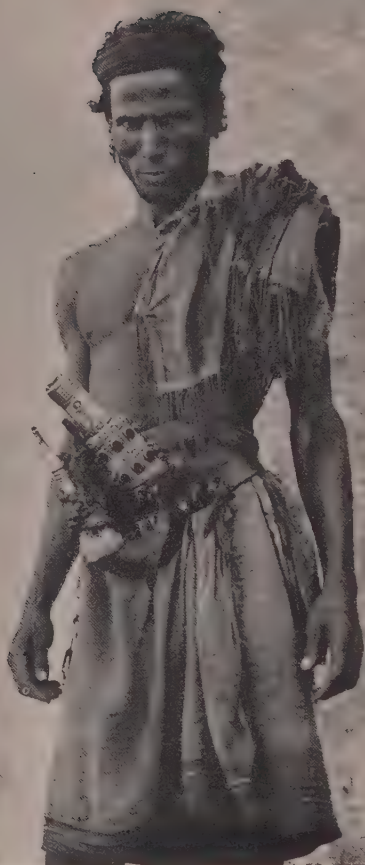
Regular soldiers are a novelty in South Arabia, but disciplined forces such as the camel troop of Makalla are already beginning to keep the turbulent tribesmen in better order

something microscopic in the way of capital, the townsman here will open a small shop and spend his days in contented contemplation beside it. Trade has ever been held in honour, and the Arabs are permitted to combine it with the most solemn event of their lives, the pilgrimage to Mecca. The brother of our Mansab, or religious Head of our town, was thinking of opening a shop and came to me one day very full of this project, and with a delightful poem of welcome composed in the person of the shop to its customers: this was to be put up by the door. The secondary matter of what the shop was to sell had not yet been decided.

The Mansabs were the chief people with us, and combined the religious and temporal powers of their districts, working together with the headmen of the tribes in a partnership defined in a loose way by custom. The system works as well as any-

thing can do where physical force is in one hand and moral authority in the other. It will be superseded by the power of a more regular government as soon as the Qe'aiti and Kathiri Sultans, the chief rulers of the land, have got together a police force capable of keeping order. Hitherto the mercenary troops stationed in the country have been a thorn in the flesh rather than a protection to its more peaceful inhabitants. They are aliens in the first place, drawn from the Yafa'i highlands, a ten days' journey away; they can be distinguished at a glance, dressed more brightly than the local people, their silver daggers and armlets studded with cornelians, lounging with a graceful swaggering arrogance independent of popular approval. They form a personal body-guard to the governor of a district, and dance below his windows and shoot off their rifles in his honour on any day of

The older type of mercenaries, swaggering Vafa'i highlanders enlisted by the district governors, were 'a thorn in the flesh rather than a protection to the more peaceful inhabitants'



When properly trained, however, they make excellent soldiers: and if much of their energy is now diverted into useful channels, they still enjoy releasing it in wild highland dances on festive occasions



An Arab sea-captain, whose ancestors voyaged regularly to Java and Zanzibar when for Europeans these were lands of fabulous report

public rejoicing, and are pleasant, gay people, whose troublesomeness arises only because they are aliens in the land and therefore careless of it. Such of them as have been drawn into the new police force, or the Resident's bodyguard, soon become excellent soldiers. They are being trained by the united care of the only two Englishmen in the country, Mr Ingrams the Resident Adviser and Captain Hopkins of the Welch Fusiliers, in whose hands the small army of the Hadhramaut is taking shape.

There are two very cogent reasons for creating this small army. In the first place it is hoped to save the R.A.F. in Aden from the necessity of intervening every time one tribe happens to steal the camels of another; in the second place it is hoped to divert into more useful channels the energies of the more turbulent

tribesmen who, to the comfort of all concerned, will find it just as pleasant to be policemen as brigands. It is particularly urgent to find them some occupation now that the gradual advance of the motor car is undermining their ancient livelihood of camel traffic and sowing poverty and discontent among them. Nothing in this world, alas! will stop the gradual encroachment of the motor, and the motor is extinguishing the beduin: nothing can be done except to find him as quickly as possible some alternative way of life, and he has all the instincts, under careful leadership, for the making of an excellent soldier.

He also makes a very good sailor when he happens to be born near the sea. Indeed it is a surprise to find even inland, in a country as dry as a crust, that every Arab can swim. I asked how this could happen, and was told that it is done in the few spring weeks when the floods pour down the wadis. Everyone then turns out to bathe—even the women in the privacy of the palm groves—and the children are flung into the water and learn to swim like fish. They splash about with complete carelessness in the shark-infested bays of the Indian Ocean, secure in the belief that the shark 'only attacks those who are not brave'; and with the same sublime confidence entrust themselves in their little wooden shells on the routes of our ocean-going steamers, believing, like that great Elizabethan, Sir Humphrey Gilbert, that the hand of God is near them on the sea. I sailed in one of these dhows from the west coast of Hadhramaut to Aden, two days in the gentle arms of the S.E. monsoon; and in the night, on a settee that had been erected for me on the high carved stern, watched the low stars that seemed to sway beneath the awning of the sail and listened while at my head the steersman, to keep himself awake, repeated in a soft sing-song to himself the ninety names of Allah.

Cities of the Mayas

II. Copan

by WOLFGANG VON HAGEN

The grandiose architectural concepts of the Old-Empire Mayas, the skilled stucco-work of the artisans who decorated the city of Palenque, and the dress of its priestly rulers, were demonstrated in our last issue. The present article gives evidence of the Mayas' attainments in astronomy, the effective naturalism of their sculpture and their ability as masons and engineers. Further articles will show the development of Maya architecture in the New Empire and the Maya Indians as they are today

THE study of Maya history began with the discovery in the 16th century of the ruins of the Maya city of Copan. But before 1839, when John Lloyd Stephens and Frederick Catherwood uncovered them and published descriptions and illustrations of the intricate carvings made by these natives of Middle America, the Mayas had been relegated by an eminent 18th-century historian, Robertson, to the limbo of fable with no existence except in the braggadocio of the *conquistadores*. While it is true that the ruins of Copan had been discovered three centuries before Stephens and Catherwood made their visit, the original accounts had been so grossly misreported that it was small wonder 18th-century historians dismissed with scorn the fancied civilization of the Mayas. Stephens, with the two publications that followed his explorations, reawakened an interest in the Mayas that has been sustained through the ensuing century. Copan, however, owes its original discovery to the rumours that brought Lic. Diego Garcia de Palacio from the Capitanía General of Guatemala into the Province of Honduras in January 1576. From his report to Philip, King of Spain, we learn 'that on the road to the city of San Pedro (Sula) in the first town within the Province of Honduras called Copan are certain ruins and vestiges of a great population and of superb edifices of such splendour and skill that it appears that they could never have been built by the natives of these provinces'.

Two hundred and fifty years later the

recently constituted Republics of Central America sent a renegade Irishman, Colonel Juan Galindo, to the ruins to make an official report; that report, made five years before the visit of Stephens, contained the first accurate description of the wonders of Copan. After Stephens' visit came a host of investigators, beginning with the Englishman, Maudslay, and including many of the important archaeologists of the day, until it could be said that few ruins of the Maya area had been examined so minutely and restored so often as the ruins of Copan.



Now, after a century of experience, the Carnegie Institution of Washington is preparing Copan for its final restoration, a task to which, with the assistance of the Republic of Honduras, a handful of their representatives have devoted the last four years.

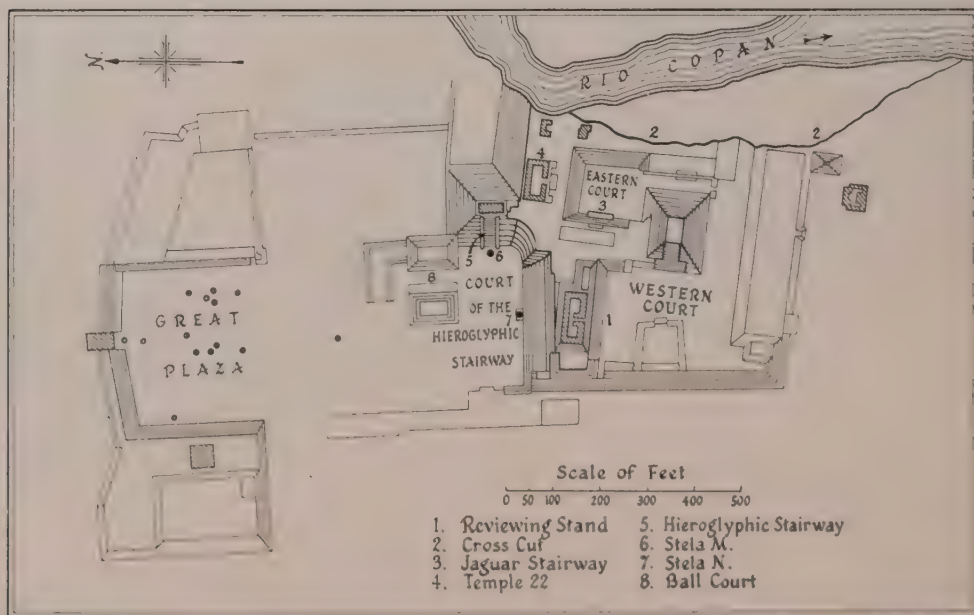
Copan, for me and my companions, marked the final phase of an expedition to Honduras and, fortified with the permission of the Secretary of Education who allowed us to photograph the ruins, we left Tegucigalpa, the capital, by special plane for Copan.

From a height of 8000 feet, the proportions and character of the valleys of Copan, in which the immigrant Mayas from Yucatan took root, were revealed with crystal clearness.

A landing-field five minutes' walk from the main ruins has been established by the Government and has now become the usual entrance into the ruins. The valley of Copan is from two to four miles in width, and not over ten miles in length. On either side rise Sierras, the lower

portions supporting pine and oak, the higher regions developing rain forests which are the habitat of hardwoods, lianas, and sarsaparilla. Wild animals abound; deer, tapir, pacas, jaguars, monkeys, and a host of brilliant birds including the Quetzal, all are found in and near the Valley of Copan. Into this self-contained fertile valley the first immigrants of the Mayas came, somewhere between the second and third century A.D.

It cannot have been long after their arrival that the Maya craftsmen discovered on the mountains to the north of the valley solid cliffs of volcanic tufa: rock-masses of trachyte, white, and sufficiently soft to be carved with their stone implements. Not only was this stone available, but also obsidian glass, which they used for knives and javelins, and basalt which when chipped was made into their *metate* stones for grinding corn. The technique of working in stone had already been perfected when the Mayas moved into the Valley of Copan, so that the first 'Stela' or calendrical stone that was erected, in



Stanford London



All photographs by Wolfgang von Hagen

*From the air the formation of the Great Plaza, 850 feet long and 325 feet wide, can be seen clearly.
The wooded Acropolis on the right hides most of the ruined city*



Neighbouring cliffs furnished material for the monoliths, or stelae, seen in the centre



The Western Court of the Acropolis, facing north. At the base of the pyramid in the background is the 'Reviewing Stand', comprising a stairway decorated with hieroglyphics and sculptures



—two of which are striking allegorical figures bearing torches

436 A.D., shows few of the characteristics of primitive sculpture, but a style which the Mayas were to follow in developing their city. The first edifices of the settlement at Copan were erected at the point where the modern village is situated, but later the religious centre was moved a mile down the valley to be near the rock quarries on the north cliff.

Approaching the ruins from the landing-field, there is nothing to indicate the presence of this great city. True, there are some stones with carved hieroglyphics lying near the road, but they are the only suggestion of the Mayas. Then one comes to a hill, rising from the valley, which is clothed in tropical verdure and festooned with large Ceiba trees that show it to be an artificial mound. Not until one climbs this mound and enters the environs of the Western Court does one appreciate the reason for Copan's fame.

The Western Court is a plaza 200 feet in length by 300 feet in width, around which

are grouped two large pyramids and one smaller one which is, so to speak, wedged in the centre. The pyramid to the north of the court is now under reconstruction. The structure at its base known as the 'Reviewing Stand' comprises, as restored, six high stone steps 100 feet long, composed of single blocks most of which are decorated with hieroglyphics. In the middle is a figure with the head missing and at either end are two allegorical figures bearing torches. Mourned for lost by Dr Morley, who first undertook the deciphering of the inscriptions at Copan, the head of one of the figures has now been found and replaced, presenting one of the most interesting features of Maya sculpture.

From the Western Court we followed the natural path that leads east to the river. Some time in the distant past, certainly long before the visit of the Spaniards in the 16th century, the river changed its course and cut through the ruins, producing one of the greatest archaeological



At some distant epoch the Copan river, changing its course, cut through the Acropolis. The cross-cut reveals that the city was not built at one time, but evolved from lesser structures

cross-cuts in the world. The Acropolis of Copan is composed of five distinct courts or plazas surrounded by pyramids, temples and what were, perhaps, the dwellings of the higher orders of the theocracy that ruled the Maya cities. The complete main structure covers about fifteen acres. Superficially, one would believe the city to have been planned and built as a single whole; but the cross-cut shows that the Acropolis evolved from lesser pyramids, less sumptuous temples; and sad as the loss of the buildings which perished in the flood-waters has been, this is repaid to archaeologists by the amount of detailed history that the cross-cut reveals.

Regaining the ruins, we came to the traditional entrance to the Eastern Court, which some authorities think to have been the most sacred of the entire city. On the eastern side of this court, which is half as large as the Western Court, are tiers of stone seats formed of herculean units that look not unlike the seats in the Roman Coliseum—blocks weighing hundreds of pounds apiece, so solidly embedded that all the destructive forces of Nature (tree-roots, earthquakes, torrential downpours) through many centuries have been unable to do more than move some of them slightly out of line.

Excavations throughout the Maya area for some decades have disclosed no metal of any importance, and it is amazing that the Mayas should have been able to cut and fashion these great blocks so precisely with their stone implements or to move them with the primitive means at their disposal. Fortunately, however, their rock quarries were only a mile distant in the hills, with a gradual descent of a thousand feet or so to the city. In the rain forest there abounded much hardwood: cedar, mahogany, and especially *cortés*, a wood as hard as metal upon which rock masses weighing up to 35 tons could be transported to the site where they were to be erected.

On the western side of the Eastern Court

is a series of steps resembling those of the 'Reviewing Stand' in the Western Court, save that here there are two large stone jaguars in amusing positions, each standing erect with one foreleg akimbo and the other stretched out at full length. They are carved in the round, and, save for the tail, form one of the most naturalistic sculptures that I have seen in the Maya area. The tail ends in a curious foliated design, for the Maya sculptors never seem to have been able to allow so natural a thing as a tail to remain undecorated. Those of the figures in the Western Court evolve into snakes' heads with extended tongues.

The seven spots on the jaguar's body are hollowed out instead of being raised in relief; those on either side of the face create the illusion of a very gaunt animal, which the powerful anatomy of the rest of the figure belies. This bold and unusual convention succeeds, especially from a distance, when the play of shadows appears to make the spots extrude.

Dominating the entire Eastern court is Temple 22, now fully restored in all the parts where the original structure could be followed. It was first uncovered by Maudslay. To reach it, one crawls up the massive stone steps to a point at which the architecture appears somewhat to resemble the later stylistic sequence of the Mayas of the New Empire. In front, on either side of an elaborate portal, are two well-proportioned carved figures, forming a caryatid to the ornamental doorway. The figures are squatting, one knee on the ground, the other bent so that it nearly reaches the chin. One hand rests on the ground, the other, Ajax-like, is bent above the head supporting a great wealth of carved allegorical symbols. This plastic mixture of arms, feathers, dragon heads, and other Maya decorative *motifs* ends at the top, still moving into space, with as little regulation as at its beginning, formless yet occupying its place in a not unpleasant surrealist design. Below the



*The Jaguar stairway,
to the west of the
Eastern Court, was
uncovered and named
by the English ar-
chaeologist Maudslay*



*The Jaguars are skil-
fully carved in the
round, with seven spots
hollowed out of their
bodies and their tails
curiously foliated*

figures is a carved tread composed of hieroglyphics with large death's heads decorated with macabre tassels.

On either side of this allegorical doorway are halls which balance one another. Their finely chiselled stonework has been beautifully restored. They lead to roofless rooms, the monotonous stone walls of which are broken by windows and by small holes made, perhaps, to hold torches during some sacred ceremony.

From the upper level of the Acropolis we climbed down 125 feet to the Court of the Hieroglyphic Stairway, which leads into the Great Plaza on the valley floor. Here the north side of the Acropolis is supported by a facing of stone blocks; and again we found that the great weight and size of each unit had kept the structure in good shape; indeed, the stones needed only

a little realigning to make it appear as it had in the days of the Mayas. We paused often in our walks to admire the stairway after which the court is named. When completely restored, it will rise 75 feet, at an angle of 60°, up to the temple that once stood at the apex of the pyramid which it ascends. Framed between carved balustrades, the stairway is twenty feet broad. At intervals in the flight are figures sitting in a stiff attitude within the mouth of a great serpent's head.

At some past epoch the stairway collapsed and was buried, leaving only a part *in situ*. Maudslay first discovered and partially excavated the treads, carved with hieroglyphics, of which the stairway is formed. There are over a thousand distinct glyphs, which the archaeologists are struggling to replace in as correct a con-



Dominating the Eastern Court is Temple 22, to which, besides the ascent from the lower level of the court, a further ascent is made up steps with treads 16 inches deep



The doorway at the top of the Temple steps is ornamented on either side by a figure squatting on one knee and supporting with one hand a wealth of allegorical symbols

tinuity as their experience permits. The inscriptions at Copan are said to represent more than 40 per cent of all known Maya inscriptions; and no ruin in all the Maya area contains as many inscriptions as does this single stairway. The difficulty of re-setting it correctly may well be imagined.

Dr Morley considers that the construction of the stairway was begun in 710 A.D., towards the end of the period covered by

the dated stelae. The Mayas had then occupied the valley for some 500 years, and their development was at its height. The erection of the great stairway must have been the supreme undertaking of its time—indeed, it is believed to constitute ‘an epitome of the principal events which befell one of the greatest Maya cities during the greatest period of Maya civilization’.

In the Court of the Hieroglyphic Stairway are two well-preserved stelae; one,



The treads of the Hieroglyphic Stairway are carved with over 1000 distinct glyphs, which constitute the longest single inscription of the whole Maya area

When fully restored, it will rise 75 feet at an angle of 60°. At intervals in the flight are figures perched stiffly within the mouths of giant serpents





Between the Court of the Hieroglyphic Stairway and the Great Plaza lies the Ball Court, where the Maya contemporaries of the Venerable Bede played the equivalent of modern American basket-ball

known as stela 'M', erected in front of the stairway and the other, stela 'N', standing out in bold relief against the pyramid on the south side of the court. The intricate carving of the latter embodies not only a striking figure with an elaborate head-dress but also, on its narrow sides, the plumes of the Quetzal as a decorative motif.

Walking northwards from this court towards the Great Plaza one passes between two small oblong mounds with a paved floor between them. These form the restored portion of the Ball Court, in which the Mayas played a game similar to the modern American sport of basket-ball. The peculiar construction of four figures, seemingly denoting large parrots' heads, which decorate the pyramids on each side of the court, has led some travellers to see in them a resemblance to elephants' trunks and to publish such learned papers as that

entitled *Pre-Columbian Representation of the Elephant in America*. Since, however, the Maya sculptor could seldom follow a model with any accuracy, and since he was in the habit of filling every vacant space with variations of some *motif* that struck him as interesting, the zoology of Maya sculpture is not a safe ground on which to build hypotheses of a connection between two widely distant civilizations.

From the Ball Court one enters the Great Plaza where the gigantic stone monoliths are centred. Even in the times of the Romans the Plaza would have been regarded as enormous: it is 850 feet in length by half of that in width, the whole flanked by stone seats that rise, tier above tier, to a height of 30 feet. Distributed throughout the Plaza are the dated stelae. These enormous monoliths, carved with only stone chisels from a single block of stone, display, usually on their sides but sometimes on their

backs also, a series of hieroglyphics that relate to the date of their erection. The image that appears on the front of each is assumed to have been a heroic portrait of a contemporary ruler. First erected in twenty-year cycles, the history of Copan reveals that the stelae were later set up as often as every five years. Since only the hieroglyphics of calendrical significance have been deciphered, we may infer that the others, which seemingly have no relation to the calendar, or at least as such are undecipherable, refer to some outstanding cataclysms or events that took place before the erection of the calendar stone on which they appear.

As the Mayas were primarily agriculturists, it is only natural that they should have concerned themselves with the rising and setting of constellations and the seasonal flux, and attempted to determine the solstices and equinoxes. How old the Maya calendar is remains a matter of conjecture. Admittedly it took hundreds of years to perfect, and by the time the Mayas at Copan had erected their first dated monolith in 436 A.D., they were not only, after the centuries of experience that preceded the colonization, masters of the art of stone-carving, but were also accomplished astronomers able to embody the phenomena that they had observed in calendar form by means of the ideographs carved on the stelae. This complex calendar was, it is supposed, erected to inform successive generations of the most favourable times to reap and sow; what gods should be appeased; the cataclysms of the past, and perhaps how they might be avoided in the future. The stelae became, in fact, the *alpha* and *omega* of Maya religion.

In their archaic period before they were able to develop their cities of stone, the Mayas had received from their precursors the gift of corn.

Maize, as is well known, originated in the Americas, but where is a matter of conjecture. Evidence seems to point to the

development of maize in the Central plateau of Mexico from a grass superficially resembling it and called by the Mexicans *Teosintle*. Because maize could be stored for comparatively long periods, it allowed the Indian respite from hunting, and with the development of maize-growing the Mayas left the hunter-fisher stage of the savage and entered upon a more sedentary phase. With the residue of leisure that their harvests left them, the Mayas turned their excess energy to erecting cities of stone.

Without even the simplest form of plough, the Maya farmer planted his corn by merely inserting a pointed stick into the earth and dropping in the seeds. When the corn had grown and been cut, beans were planted in the same spot. There was no rotation of crops. The life of a plantation depended only on the original virginity of the soil and its inherent richness. The Mayas had no draught animals and did not, as far as we know, use any type of fertilizer as did the Incas in Peru. The agricultural practice then, as now, was to plant the field (known to the modern Mayas as a *milpa*) until it no longer yielded sufficient to make further planting worth while, and then go elsewhere, cut trees, burn forests and begin the whole cycle over again.

A more regulated way of life led to a great increase in population and so large was the consumption of maize, which, to judge by modern analogy, must have composed four-fifths of the Indians' diet, that they were obliged to plant more and more milpas further and further away from the city.

The population of Copan is of course not known, and there is nothing on which to base a calculation except the immense amount of labour expended on its monuments. Thousands must have been employed, and time was perhaps given them to tend their own milpas. I have calculated from observation of present-day Indians that each consumes two pounds of corn a



Stelae in the Great Plaza. Hieroglyphics carved on their sides relate chiefly to the calendar



On the front of each stela is carved a figure, assumed to be a portrait of the theocratic ruler at the time the stela was erected. The head on stela 'N'

day for his corn-cakes or *tortillas*. Given an absolute minimum of ten thousand souls in the Valley of Copan, twenty thousand pounds of corn a day would have been necessary for their consumption! Considering the primitive methods of agriculture, it is obvious that the valley in time was inadequate to nurture the tribe, and so, two hundred years before the collapse, Copan began to develop colonies. North-east, in the next valley of Chamelicon, are the ruins of Los Higos and La Florida, all showing the same stylistic sequence as Copan. Thirty miles to the north-west, the 'Copanecos' built Quirigua on the banks of the Motagua river in Guatemala, the most famed of Copan's colonies. They even migrated as far south-west as the Lago de Yojoa, well into the interior of Honduras.

Copan, no doubt, as the wealth of its monuments proves, was the intellectual centre of its time. All Mayadom looked to it, innovations in architecture and in the application of astronomy emanated from it. For 345 years archaeologists can follow the progress made. Then suddenly it ends. From the time of the last stela onward, there is an immense hiatus; nothing more was built at Copan. Nothing tells us what happened. Since the cities were not fortified there is no reason to suspect war. There was no destruction within the city; the iconoclastic hand of time is alone responsible for the overthrow of the monuments, and the Mayas in their inscriptions tell us nothing of themselves. We do not know the true names of the cities that we call Copan, Palenque. We do not even

know the actual name of the people we choose to call Mayas. The word 'Copan', which Dr Morley doubts even to be of the Maya tongue, merely means 'bridge'. And to top it all we do not even know the language spoken by the Mayas who occupied the Valley of Copan.

Many theories have been put forward to account for the desertion of Copan. But the history of its abandonment is little different from that of other cities of the Mayas. Pestilence, war, famine, climatic changes, all have been thoroughly reviewed and subjected to a searching examination. From all the evidence there seems to be but one conclusion: the desertion of the cities by the Mayas was caused by the exhaustion of the soil round about and the decentralization of the tribe owing to the extension of the milpas away from the cities.

But what caused the final exodus, and why did the Mayas return to Yucatan once again?

From about the 8th century A.D., they began to concentrate in the northern part of Yucatan and to reoccupy the regions where they had dwelt in the past. But peace no longer reigned as in the good old days. The Toltecs of the Mexican plateau gained a foothold in Yucatan. The Maya architecture underwent a change. The Mayas had always showed themselves masters to an extraordinary degree of the sculptor's art, with their sensitive modelling and their fine sense of proportion. The art in the Old Empire was naturalistic; at Copan at least sculpture in the round had never reached a higher plane. Toltec influence, with the increased ritualistic symbolism that had come into the Maya religion with the cult of the Toltec king-god Quetzalcoatl, began to show itself in the planning of great groups of buildings which denoted a passing from the naturalistic style to the geometrical and decorative, with increasingly tropical luxuriance of detail as well as the angularity and stiffness that accom-



A stela embodying, as a decorative motif, the plumes of the Quetzal, which in the New Empire became connected with a religious cult



Carved from a basalt rock in a field near the ruins, this frog is a fine example of the Old Empire Mayas' fondness for representing animals in a humorous, yet naturalistic style

pany geometrical architecture. But the greatest innovation was the architectural *motif* of the plumed serpent, symbol of the cult of which Quetzalcoatl was the titular head. This *motif* was a snake's body in which the scales of the reptile became the elongated plumes of the Quetzal bird. This theme appeared first at Copan; but there it was never exaggerated; it was part of a design, a mere addition to the apocryphal zoological phantasies of the Maya. In the New Empire, however, it became a fetish, appeared ubiquitously and gained ever wider acceptance as communication between the tribes of Mexico and Middle America increased.

Contemporary with the decay of the Roman Empire in Europe, and before the seeds of the Renaissance began to flower,

the Mayas had already attained in the Old Empire a civilization as unique and an art as distinctive as those of ancient Egypt. It had developed all the refinements of a cultured barbarism, and scholars even assert that the Maya hieroglyphic writing was passing into a stage of almost alphabetic significance. And by the time that Leif Ericson was making his voyage to the Americas; that Gothic architecture in Europe was in its birth-throes; that Angkor Wat in Indo-China was being erected and Oxford University was becoming a corporate body, the Mayas, unknown to the rest of the world, were reviving in the New Empire their autochthonous culture and a system of government which grew up by itself and within itself, unaided by the forces of the old world.

Places and Products

V. Cheshire Salt

by A. K. HAMILTON JENKIN

The article on North Wales Slate in our November issue showed how the extraction of a product can enhance most dramatically the scenic qualities of a place. Brine-pumping, an essential process in the Cheshire Salt industry, also affects—though very differently—the scene of operations

Most people have a personal interest in the word 'salary', though probably few would associate it with its original meaning of an allowance of money given to Roman soldiers to buy salt. Salt in the ancient world was valued for something more than its mere savour. It was the only known form of food preservative and on that account was probably among the first articles of trade.

The wonderful free-flowing brine springs of Cheshire, round which grew up the ancient salt towns of Nantwich, Middlewich, and Northwich, were certainly known at an early date. Prior to the Roman occupation salt was obtained from them by the simple process of pouring the brine over faggots of burning charcoal and scraping off the crystals as they formed. The Romans themselves introduced the system of evaporation in open pans set over a fire, a method which remains unaltered in principle to this day. One of these Roman brine pans, made of lead and measuring approximately 3 feet square by 6 inches deep, is now preserved in the Northwich Museum.

As late as the 17th century the brine springs rose almost to the surface, without need of pumping. 'At Northwich', it was stated in 1605, 'is a deep and plentiful brine pit with stairs about it by which, when they have drawn the water [*i.e.* brine] in leather buckets, they ascend half naked to their troughs and fill them. From thence the liquid is conveyed to the wick-houses [*i.e.* the boiling pans] about which there stand on every side many stakes and piles of wood.'

The 17th century saw two important changes in the Cheshire salt trade. The first was the introduction of iron evaporating pans heated by coal, a measure which to a large extent freed the industry from the control of the timber-owning gentry.

EARLY MINING AND ITS EFFECTS

Of even greater importance was the discovery of rock-salt. In 1670 a certain William Marbury, whilst boring for coal on his estate near Northwich, 'lighted upon a rock of salt as hard as allom and as pure which, when pulverized, became an excellent sharp salt'. At this date the Fire of London was still fresh in the public memory and the contemporary account goes on to say that 'out of the auger-hole brine blew forth more fierce than if it had been squirted out of a London water-engine used for quenching houses on fire'.



This bed of rock-salt was about 35 feet thick and lay at a depth of 33 yards from the surface. Within a short time, despite the bitter opposition of the older brine producers, it was being extensively worked. In 1779 a second bed was discovered below the first, and at an average depth of 150 yards from the surface. In this the salt was not only of a purer quality but there was less water, whilst the problem of supporting the roof presented fewer difficulties. In all some 67 mines have been worked in the bottom bed and approximately 40 mines in the upper.

Whilst the evaporation of brine continued throughout, for a century at least rock-salt *mining* constituted the major source of production. Meantime the industry was labouring under the restrictive influences of the Salt Duty. First imposed in 1694, this tax was increased in 1697 to 2s. 8d. a bushel, and made perpetual. By 1815 it had reached the exorbitant figure of 15s. a bushel. Its incidence was felt most hardly by the poor among whom it was commonly reckoned that it required the whole value of one side of the carcass of a pig to buy enough salt to cure the other half. As a consequence, salt smuggling was extensively practised, and every sort of device was employed to outwit the revenue collectors.

It was not until 1825 that the combined opposition of the Cheshire dairy farmers, the Liverpool shippers, northern industrialists and the harassed fishermen of the United Kingdom proved so strong that the Government was forced to give way, and in that year the salt tax was finally abolished.

One of the immediate results was a fall in the price of the best quality salt from 30s. to 9s. a ton. Small buyers 'that never before bought above seven pounds at a time in their lives went away smiling with half a hundredweight'. The way, moreover, was opened for the rising chemical industries of the county, and the salt trade in general took on a new lease of life.

Towards the end of the last century the salt districts of Cheshire entered upon a new phase of industrialization, due to the immense development of alkali manufacture in the hands of Messrs Brunner, Mond. The site chosen for the first of their great works was at Winnington, near Northwich, where a frontage onto the navigable river Weaver provided access to the Mersey and the docks of Liverpool.

The three basic raw materials needed for the new process were limestone (brought from Derbyshire), salt and coal. As the works increased in number and capacity the demand for each of these developed upon an unprecedented scale. By this date many of the old rock-salt mines of the neighbourhood had been abandoned, and their water-filled workings had become vast reservoirs of saturated brine. It was from this source that the bulk of the salt for the new chemical works was obtained.

SIXTY YEARS OF SUBSIDENCE

It was not long before the wholesale pumping of the brine produced the most extraordinary effects upon the surface. The land, no longer supported by the subterranean reservoirs, began to sink. The huge subsidences, thus formed, filled with rain water and resulted in the chain of artificial lakes or 'flashes' which today extend along the whole of one side of the town of Northwich.

The first of the great subsidences took place in the year 1880. Early in the morning a rumbling noise was heard on the outskirts of the town. Immediately the ground was seen to be heaving, and the lakes and pools commenced to bubble furiously. Wherever there was a weak spot in the ground, air and foul gas were forced up in jets from the mines below. For several hours, twenty or more of these geysers were spouting at one time, some of them throwing up mud and sand thirty feet into the air. As the ground opened wider still, streams were swallowed up, whilst chimney stacks, engines and salt

The artificial lakes or 'flashes' extending along one side of Northwich are the result of huge subsidences in the earth which horrified the people one morning in 1880—



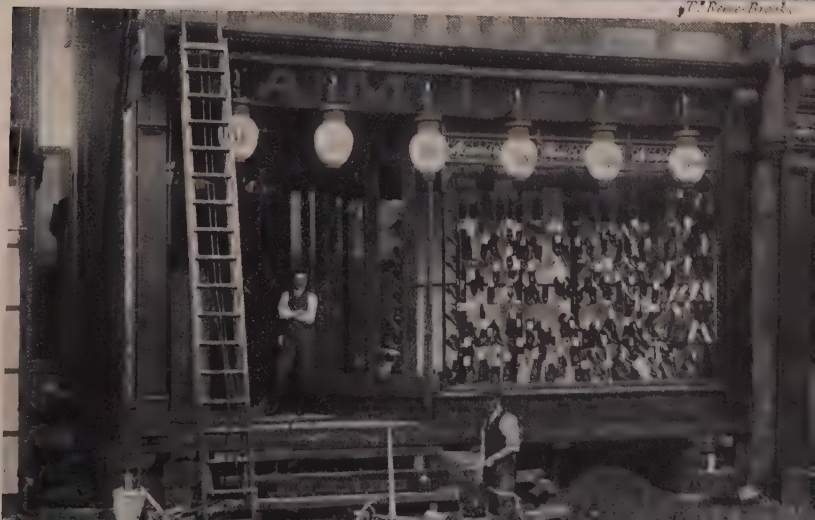
T. Kece-Brooks

—and which have since continued as a gradual sinking of the whole neighbourhood. Not only land, but houses and factories have disappeared, and in the town itself—



T. Kece-Brooks

—the modern shops are built in special frames, so that they can be lifted and straightened with hydraulic jacks, a process which has become almost a local art



pans disappeared into the gaping earth. At last the movement ceased, leaving a broad sheet of water where formerly there had been salt works and green fields.

From that time on the sinking throughout the neighbourhood was continuous. Acres of land entirely disappeared. Houses once approached by flights of steps sank within living memory to several feet *below* the level of the streets. The poorer quarters of the town became reminiscent of an earthquake area. Buildings with cracked and fissured walls leant drunkenly at every angle from the perpendicular.

Meantime resentment was growing in the neighbourhood. The people of Northwich and Winsford were being pumped out of their houses and their lands, and there was every prospect of a continuation and extension of the damage. At last,



T. Reece-Brooks

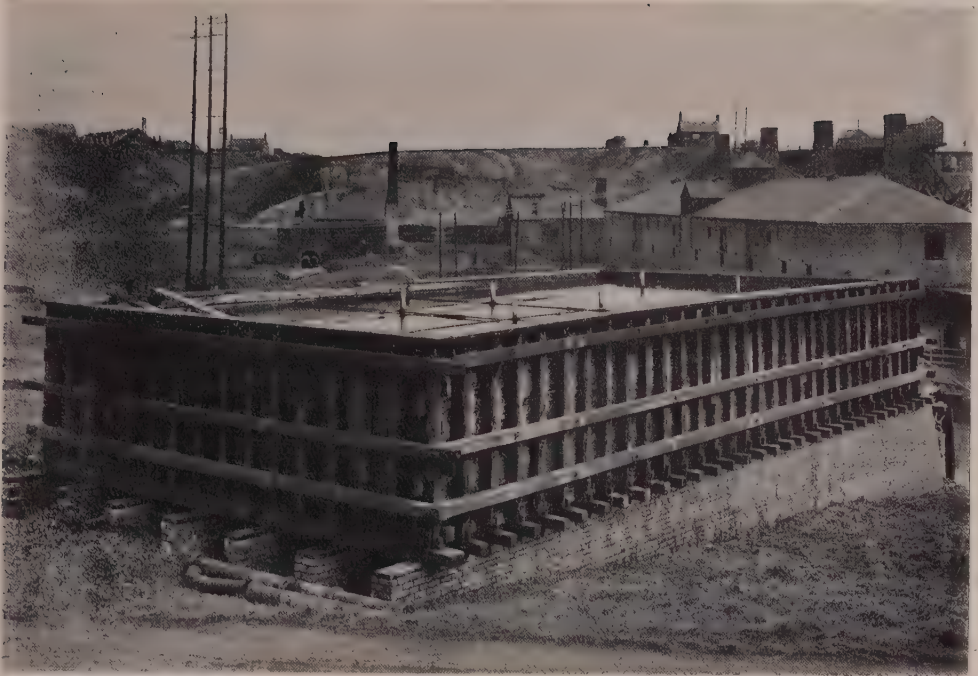
Not A.R.P. trenches being dug, but Northwich High Street being repaired after damage caused by subsidence to property, drains, water and gas mains

after ten years of violent opposition from the salt companies, the Brine Pumping (Compensation for Subsidence) Act was passed in 1891, with power to levy a yearly rate not exceeding threepence per 1000 gallons of brine pumped.

Today the modern shops and business premises are all built in frames, so that they can be periodically lifted and straightened with hydraulic jacks. This work has become almost a local art. Buildings weighing hundreds of tons are not infrequently raised from two to three feet at a time without so much as cracking a pane of glass or interfering with the normal course of business.

SALT IN THE MAKING

At the present time the greater part of the salt produced in the area is obtained from 'wild', *i.e.* natural brine pumped from a depth of about seventy feet below the surface. From the wells it is delivered into reservoirs or wooden cisterns, whence it is run into the evaporating pans as required. In appearance the brine is indistinguishable from limpid water, yet it is the strongest in the world, holding one quarter of its weight of pure salt in solution. The present-day pans in use at the Imperial Chemical Industry's works at Winsford vary in length from 60 to 100 feet, and in width from 25 to 30 feet. Their depth is about 2 feet. These pans are constructed of riveted steel plates resting on brickwork fire flues. Furnaces at one end supply the heat, which is drawn beneath their entire length. As the brine warms and begins to 'work', the salt forms on the surface in flakes or sheets resembling thin ice. From time to time these break and fall to the bottom of the pans. The lower the temperature at which evaporation takes place the harder and larger are the crystals of salt formed. In consequence, many different grades of salt can be made in open pans. In the case of Lump Salt for domestic purposes the brine is kept at boiling point and the



Stewart Bale

Pumped from wells 70 feet below the surface, brine is delivered direct into reservoirs or wooden cisterns. Wholesale pumping has caused all the strange disturbances shown in the preceding photographs

salt is drawn continuously. Common Salt is prepared at a lower temperature and stays two days in the pans, whilst Fishery Salt requires as much as fourteen days.

The atmosphere in the 'pan-houses' is dense with steam, and visibility is reduced to a matter of a few feet. The men work naked except for a pair of loose shorts, and clogs. Such is the heat that a man will commonly drink a gallon of tea or other non-alcoholic liquid in the course of a shift, and perspire the same amount in that period.

When ready for removal, the salt is drawn to the sides of the pan with long-handled rakes. From here it is lifted out with perforated shovels known as 'skimmers' and thrown down to drain on the 'salt hurdles' or wooden floors which lie between the pans. Further drying of Common Salt takes place in the adjoining

store. Here it lies in great white glistening heaps, twenty feet or more high, for a period of three to six months.

Lump Salt, such as the 'handed squares' sold in the grocers' shops, is prepared in a somewhat different way. In this case the salt is laded by skimmers into oblong wooden boxes or 'tubs' with slotted bottoms. These are placed on rails inside the pans, into which the greater part of the moisture directly drains. After a further period of draining on the 'hurdles', the tubs are emptied—much as a child tips out a sand-castle from a bucket—and the blocks thus formed are smoothed with a wooden tool to produce a good finish. They are then removed to the adjoining 'hot-house' where they remain for a period of two or three weeks to dry. The temperature in these 'hot-houses' rarely falls below 150° and is



Skimmers' Pans

From the storage cisterns the brine is run into huge evaporating pans heated by furnaces: when the salt forms it is removed with 'skimmers' and allowed to drain on the wooden floor 'above'. In the storeroom the glistening heaps of salt are left to dry for as long as six months 'below'.

Storeroom, Italy



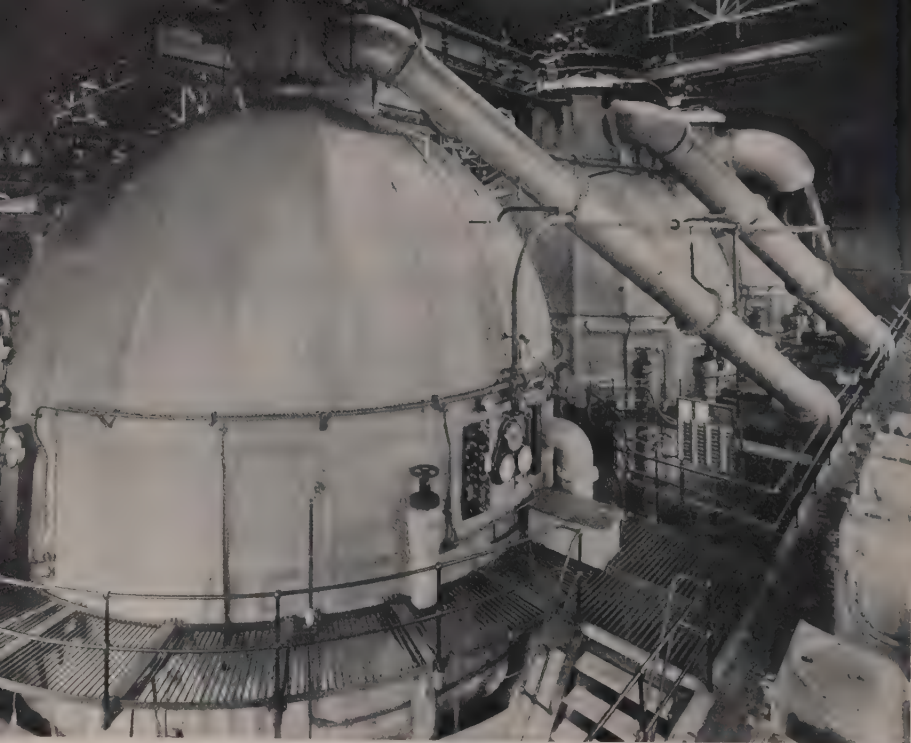


Stewart Ba

Lump salt is prepared by lading the salt into tapered boxes with slotted bottoms, fixed so as to drain into the pans (above). When the blocks have set they are tipped from the boxes, carefully smoothed with a wooden tool, called a 'hap', and finally laid out to dry in the 'hot-house' (below)

Stewart Ba





Edward Bale

Cone-shaped vacuum evaporators are used as a modern method of extracting the salt under diminished pressure. From natural brine inside the pans to pure salt drying in the storerooms, the whole process is carried through almost without man's intervention



sometimes as much as 190° Fahr. They are probably the hottest working-places on earth, and in comparison with them the plains of India in summer would seem cool and refreshing!

'Lagos' Salt, a variety specially prepared for the West African trade, is also produced in the form of blocks, but these are subsequently ground by machinery in order to make the particular light-weight product in demand among the natives.

THE PROCESS MODERNIZED

Until a quarter of a century ago the open-pan system of evaporation was the only method used in Cheshire. Today immense quantities of salt are also obtained by means of vacuum pans the operating principle of which is that under diminished pressure evaporation of the brine can be induced at relatively low temperatures.

The vacuum plant at Winsford consists of three cone-shaped evaporators approximately 50 feet high and 18 feet in diameter. Inside these cones are some 2000 vertical tubes through which the purified brine passes, whilst hot steam circulates around them. As the heat evaporates the water, the salt falls through the tubes to the bottom of the pan, whence it is elevated to rotary filters. The salt crystals, now containing 3 to 3½ per cent of moisture, fall onto a conveyor belt which takes them either to the dryers or to storage, as required. Undried vacuum salt is largely used by soap makers, aniline dye manufacturers and for water-softening plants.

The dried vacuum salt, on the other hand, is subsequently sifted and graded into what is known as 20 and 40 mesh, *i.e.* into salt which will pass through a sieve with 20 meshes to the inch and that capable of passing a sieve with 40 meshes to the inch. The finest salt is packed by machinery and sold in cartons for table use. Of the remainder, the greater proportion is used in the making of margarine, and for export to butter-produc-

ing countries such as Denmark and New Zealand.

INSIDE THE ROCK-SALT MINE

As already shown, the bulk of Cheshire's salt output is now obtained by pumping and evaporating the natural brine. Only in one instance is rock-salt actually mined in England today, this being at the I.C.I.'s Meadow Bank mine at Winsford. The workings here consist of a great circular underground quarry excavated in the lower salt bed at a depth of 156 yards from surface. The property, which is an old one, was reopened in 1929, at which time the area of the cavern was approximately 12¾ acres. Today the excavation covers 15½ acres, the diameter of its circle is 600–700 yards, and the height from floor to roof 18–20 feet. The output of the mine averages 400 to 500 tons a week.

The mining operations are of the simplest character. Pillars of salt, measuring 12 yards square, are left at intervals of 25 yards to support the roof, which requires no timbering. Immediately under the roof a 'gallery' is excavated to the height of 6 feet by means of electrically-operated channeling and heading machines. The salt thus obtained is generally of an inferior quality. Beneath this the remaining 13 feet or so of the bed, extending from the gallery to the floor of the mine, is called the 'lench' and consists of the purest salt. Being almost as hard as concrete, it is drilled by compressed air machines and blasted with black powder which brings down as much as 20 tons at a time. From the face, small electric locomotives convey the broken rock to the shafts.

Until recent years the blasting charges were ignited by fuses composed of straw filled with fine gunpowder. Today ordinary time-fuses are employed.

The traditional rock-salt miner's dress consisted of a white skull cap, dark flannel shirt, linen knicker-bockers, blue stockings and wooden-sole boots. This picturesque



A rock-salt 'mine' is really a cavern, acres in extent. Below an upper gallery lies the purest salt, hard as concrete, which is drilled by compressed-air machines and blasted with black powder

A fall of as much as 20 tons may result. These photographs were taken in the I.C.I.'s Meadow Bank mine at Winsford, the only place in England where rock-salt is actually being mined today



Fox Photos

From the face of the mine small electric locomotives convey the broken rock to the shafts

costume has only ceased to be worn by some of the older men within the last few years.

The Meadow Bank mine is electrically lighted throughout, the actual working faces being floodlit. The temperature of the air never varies, and is constant at 54° Fahr. throughout the year. Explosions are unknown, for no dangerous gases are found in the salt deposits, and the high roof ensures good ventilation. From the picturesque standpoint an English rock-salt mine has none of the glamour of the wonderful glistening-white halls and galleries of the Wieliczka mines in Poland. The Cheshire rock-salt varies in colour from a dark amber to that of raw beef, being stained in this way by the overlying marl.

The bulk of the rock-salt is sold in lumps varying from 14 to 96 lb. weight, as mined. In this form it is used for 'cattle licks' and, in addition to the home market, is exported to Canada, Australia, New Zealand and all parts of the Empire. The remainder is

crushed on surface and sold for agricultural purposes, being shipped in barges down the river Weaver.

Stacked underground may also be seen large quantities of inferior rock which find an occasional sale for spreading over pavements during frosty weather.

THE INDUSTRY'S CHANGING STRUCTURE

The history of the Cheshire salt trade is illustrative of the trend of English industry in general. For centuries the control of the brine pits rested with a small number of landed families who had enjoyed their monopoly since Norman times. The discovery of rock-salt and the introduction of outside capital during the late 17th century first seriously challenged this squirearchic ownership, which at length gave way before the new Whig forces of the merchant class. In the hands of the latter vast fortunes were made whilst at the same time, in the words of Mr A. F. Calvert, the industry



Most of Winsford's salt is exported. From the convenient Weaver it travels to the Mersey and on to Liverpool, whence it is shipped to far-distant corners of the world

provided a chronicle 'of produce sold at ruinous loss, of obsolete methods stubbornly persisted with, and of hardship and injustice callously inflicted' in the attempt of the salt magnates to crush competition and control prices. Out of this welter of conflicting interests sprang the Salt Union which was formed in 1888 with a capital of £4,000,000 to consolidate the undertakings of the salt proprietors of the United Kingdom.

In the Salt Trade, however, as elsewhere in the industrial field, new forces have been continuously at work in the period since the War, and today the structure of industry tends towards establishment on an ever-widening basis. In keeping with this it is interesting to note that the Salt Union itself has recently passed under the control of Imperial Chemical Industries and thus become a constituent part of a world-wide organization.

Germany's Former Colonies

For the moment, since fellow-signatories of the Anti-Comintern Pact presumably do not demand territory from each other, topical interest in the Japanese Mandated Islands of the Pacific is less than in Germany's other former colonies. The importance of these islands is, however, well brought out by Professor Clyde, who has travelled extensively among them, is the author of the authoritative work on Japan's Pacific Mandate, and holds the Chair of History at Duke University, North Carolina

V. The Mariana, Caroline and Marshall Islands

by PAUL HIBBERT CLYDE

REMOTE islands of the tropical Pacific, where the surf breaks over coral reefs and palm trees cast their shadows on still lagoons, have served writers of fiction exceedingly well. They provided, as perhaps no other setting could, those essentials of mystery and romance so inseparable from a good story. But these islands have long since been taken over by the political scientists and by those who still follow the cortège of that deceased member of the legal family—the body of international law. This, of course, should not be surprising. Where is the fiction that can rival world politics either in mystery or in romance?

THE former German islands in the north-western Pacific, ruled as a Class C Mandate by Japan since the World War, have in recent years gained a notoriety quite out of proportion to their area: a mere 836 square miles.

This importance is to be attributed neither to their number (for there are some 2500 of them if the smallest reefs be counted) nor to their natural resources which are of little relative consequence, but rather to their position, dotting like stepping-stones the immense triangle of ocean that lies between Japan, the Philippines and the Hawaiian Islands, and to the ambitions of Germany to regain her former colonial empire.

The three groups of islands that compose the mandate lie far from the well-travelled channels of ocean commerce. The Marianas (named after Maria Anna of Austria) are 1200 miles south of Tokyo; still further southward the Carolines (so called in honour of Charles II of Spain) extend for more than 1000 miles in a great belt just north of the equator; on to the eastward again the coral atolls of the Marshalls (named after the navigator who visited them in 1788) cover a vast expanse of ocean.

MAGELLAN discovered the Marianas (Ladrone or Robber Islands as he called them) in 1521. Legaspi attempted unsuccessfully to occupy them in 1565. Jesuit missions were established in 1668, but it was not until the beginning of the 18th century that the natives of both the Marianas and the Carolines made some pretence of accepting their Spanish overlords. The Marshalls were visited by British navigators in the late 18th century, but were not formally occupied by any European power until more than a century later, when, in 1885, Germany annexed them. In fact, prior to this date, little interest, save that of the missionaries, was shown in any of the three groups commonly referred to as Micronesia.

Germany's interest in this area increased

**Discovery
and
Annexation**

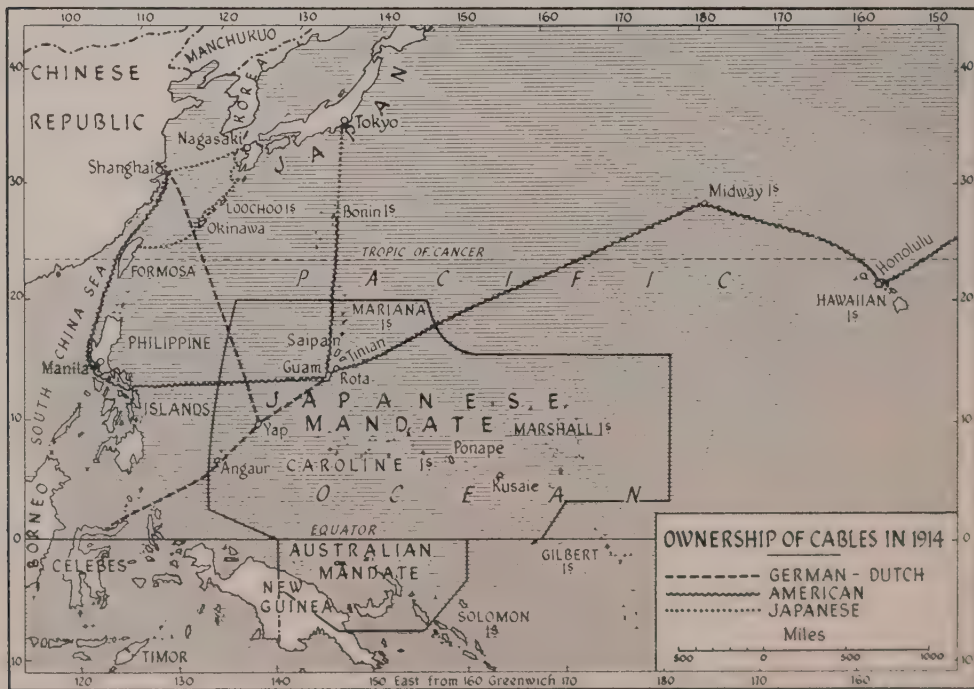
**Why the
Islands are
Important**

rapidly between 1860 and 1880, at a time when many of the so-called Great Powers, including Great Britain, France and the United States, were scrambling to control the scattered islands of the western and southern Pacific. German commerce, working through the agency of the Jaluit (a privileged) Company, was the first to exploit the Marshall Islands which, as already noted, were annexed in 1885.

A YEAR later Germany disputed with Spain possession of the Carolines. Spanish control in these islands had never been effective; and after 1877, when Germany and England were guaranteed freedom for trade within them, the former established a number of commercial stations. In 1885 the German government extended imperial protection to these commercial (privileged company)

stations: an act which promptly brought forth a storm of protest in Spain. Bismarck referred the matter to the Vatican, where the Papacy, as was to be expected, confirmed Spain in her possession of the Islands but granted Germany freedom in trade and in the fisheries, equal rights in the purchase of copra plantations and a naval base. Thus when the Spanish-American War broke out, in 1898, Germany not only possessed the Marshalls: she had likewise a strong commercial lien on the Carolines.

Hoping to profit by the war, the German Foreign Office contemplated a protectorate in the Philippines. This idea gave place, however, to a German desire for neutralization with the reservation that should neutralization fail, Germany would demand adequate colonial compensation elsewhere. In view of the growing American sentiment favouring annexation, a development supported by London, Ger-



Stanford, London



Despite the influence of Japanese schooling upon the younger generation, ancient customs die hard in Micronesia, especially among the native aristocrats of Yap, who still perform war dances in traditional dress

many proposed that she be given 'maritime fulcrum', including Samoa, the Caroline Islands and a naval station in the Philippines; in return for which she was prepared to support the American policy of Philippine annexation. Since, however, these overtures met with little encouragement, Germany approached Spain directly. By secret agreement (September 1898) she acquired an option on the principal islands of the Carolines. It was on the basis of this agreement that Germany protested when the United States showed some interest in acquiring Kusaie (of the Carolines) from Spain as a cable station. Finally, in December 1898, Spain agreed to sell Germany not only the Carolines but also the Marianas, excepting the Island of Guam, which was to pass to American control. By the close, therefore, of the Spanish-American War Germany possessed all of the Marshalls, the

Carolines and the Marianas excepting Guam. Her hold upon them remained unchallenged until, after the outbreak of the World War, they were occupied by the Japanese navy in the closing months of 1914.

IN 1919, after Germany had renounced all rights in her overseas possessions, the Principal Allied and Associated Powers conferred upon Japan a Class C Mandate over the three Micronesian groups (excepting Guam). The

**Japan
Takes
Over**

mandate was designed to be a compromise between annexation and some form of international control of conquered territories. As a matter of practical politics, however, distinctions between Class C mandated territories and territories acquired by annexation soon proved to be ephemeral. With certain mild limitations



The native population of the whole mandated area numbers only about 50,000 and is almost stationary. The Micronesians, save in a few northern islands, remain content with simple palm-leaf huts and find no virtue in work, where nature is so abundantly helpful



Their diet consists almost exclusively of wild fruits and vegetables with, when they are ambitious enough to catch it, an occasional fish. The fat bonito held by this native maiden has perhaps some decorative significance—certainly not that which underlies the busy scene of industry shown on p. 223

upon her freedom of action, Japan became virtually sovereign in the former German islands.

THE first challenge to Japan's newly acquired authority came not from Germany but from the United States. In

**Disputes
with the
U.S.A.**

November 1920, more than a year after the mandate had been conferred upon Japan, the United States

informed Tokyo that the Supreme Council of the Peace Conference had, at the request of President Wilson, reserved final disposition of the Island of Yap (in the Carolines) for future consideration, with a view to placing it under some form of international control as a cable station. The American government therefore assumed that Yap had not been included in the Japanese mandate—a view which, of course, was not shared by Tokyo.

This dispute was complicated further when in December 1920 the Council of the League of Nations confirmed the Japanese mandate as 'all' the former German islands in the North Pacific. To the American protest that followed this action, the Council replied by referring the United States to the Principal Allied Powers, which as such had ceased to exist. The source of this diplomatic argument lay in the ambitions of both American and Japanese interests to control submarine cable systems in the western Pacific.

BEFORE the outbreak of the World War the Deutsch-Niederländische Telegraphengesellschaft, a company formed

**Submarine
Cable
Controversy**

in Germany but largely supported by Dutch capital and subsidized by the German and Dutch governments, owned submarine cables running from Guam to Yap, there diverging, one line going south to the Dutch Celebes, the other north-west to Shanghai. Another

concern, the American Commercial Pacific Cable Company, operated a cable from San Francisco to Guam via Honolulu and Midway Islands; a cable from Guam to the Bonin Islands (Japanese); a cable from Guam to Manila and, finally, one from Manila to Shanghai. There were thus two cable routes from Guam to the mainland of China: one controlled by American, the other by German-Dutch interests.

At the Paris Peace Conference President Wilson was advised by his communications experts to propose internationalization of Pacific cables under the control of Great Britain, the United States, China and Japan. The principal objective behind this proposal appears to have been to prevent Japan from gaining exclusive control of the former German-Dutch system and to prevent weakening of American communications with the Philippines. Resting its case, therefore, on the Wilson-Lansing reservation made at Versailles in 1919, the United States was still contesting the Japanese mandate over Yap when the Washington Conference met in November 1921. A few weeks later (December 12), Secretary of State Hughes announced that the American-Japanese controversy concerning Yap had been settled by a treaty in terms of which the United States gave its approval to the Japanese mandate, while in return Japan guaranteed the United States equal rights with the Japanese in all matters relating to cable communication. Similar rights were granted with respect to radiotelegraph, with the reservation that they were not to become operative so long as Japan maintained an adequate station.

In this manner, at least this chapter in the lively contest among the powers to control cable communication in the western Pacific was brought to a close. During the ensuing decade (1921-31) Japan's mandate rarely commanded so much as a paragraph in the press of

the world. Its sudden and dramatic re-appearance in the headlines was occasioned by the Manchurian upheaval of 1931 and Japan's subsequent withdrawal from the League.

IN February 1932 the *Journal de Genève* formulated the charge that Japan had violated the terms of her mandate by

**Misusing
her
Mandate?**

constructing a submarine base in one of the islands. This was followed by suggestions in the European

press that were Japan to withdraw from the League she would thereby forfeit her mandate, which might then be given to Germany. The Permanent Mandates Commission closely questioned the Japanese and was assured that Japan was observing the military clause which forbade fortifications. Of greater significance, however, was the announcement made in November 1933 that Japan would construct airfields in the islands, and the subsequent statement made in the Diet by Foreign Minister Hirota (February 1934) that the government did not regard its rights in administering the mandate as affected by withdrawal from the League.

From the point of view of legal theory, the question of what effect, if any, withdrawal from the League has upon a power's right to continue administration of its mandate, has never been satisfactorily answered, nor is it likely to be, for the institution of mandates has long since drifted into complete chaos. The answer, whatever it may be, involves the complicated question: 'Where does sovereignty in a mandate reside?' The international lawyers, in their efforts to find an answer, have merely agreed to disagree by evolving some ten more or less plausible theories. Perhaps it is of more importance to note that as a matter of practical politics Japan is sovereign in her mandate if the events of recent years have any significance at all.

SINCE the close of 1934 charges that Japan was fortifying the Islands in violation of the terms of her mandate have in large part ceased to appear in the western press. When in that year I visited the

**Not Guilty
but . . .**

Islands I was unable to discover any valid basis for the charges. Corroborating this view are the more recent statements of Willard Price in his *Japan's New Horizon*. Although it would thus appear that the accusations against Japan were unjustified, it should not be inferred that the mandate is without strategic significance. As sites for permanent land fortifications or naval bases, the Islands have little value; but for airfields, minor repair stations for small craft, and as shelters from which to command a wide area of the western Pacific, their value is great. These considerations have led to the pronounced interest of the Japanese navy in them. It is also noteworthy that they lie athwart the line of direct ocean communication between the Hawaiian Islands and the Philippines.

IN contrast with the complex international problems affecting the Islands, questions of domestic administration and exploitation

**Domestic
Problems**

have been and are simple. This may be understood when it is recalled that the total area of the mandate is only slightly more than 800 square miles; that its natural resources are in the larger sense unimportant; and that its native population of some 50,000 persons is virtually stationary.

Since their discovery by Europeans, the Caroline, Mariana and Marshall Islands have been treated to a variety of governments. The administration introduced by Spain was religious rather than political, being for the most part in the hands of the Catholic priesthood. Fortifications were erected in some of the Carolines such as Yap and Ponape, but beyond this little was done.



Japanese immigrants, now outnumbering the natives, are chiefly employed in the sugar industry of the Marianas; factories (that on Tinian is here seen) convert into exports worth £1,000,000 a year—



—the product of plantations that increased in area from 48 acres in 1916 to 23,000 acres in 1934. Tinian's low tableland has been transformed into a continuous stretch of cane-fields



Japanese energy has created modern settlements such as Gurapan, capital of Saipan in the Marianas: contrast, with the Town Hall on the right, the native dwellings depicted on p. 218

THE attitude of the Germans was quite different. Their interests in the Pacific were at first purely commercial, dating from about 1857, when Godeffroy of Hamburg entered the Samoan trade.

**German
Methods and
their Effect**

From these beginnings came the so-called privileged companies. There were a number of these, such as the New Guinea Company, designed to promote German commerce and to protect German trading posts in the Pacific. Among them the most successful, although the smallest, was the Jaluit Company which, in 1887, was accorded special privileges in the Marshall Islands, where, in return for a monopoly in the guano and pearl industries, it agreed to support the imperial officials sent to administer the Islands. The principal product exploited by the company was copra. After the Spanish-American War, when the German government extended its official control to the Carolines and Marianas, acquired

from Spain, the Jaluit Company likewise expanded its activities in these groups. By 1906, however, commercial competition, principally from Australia, led the German government to take over the work of the Jaluit Company, while the Marshall Islands were created a province under the government of New Guinea. It was not until this date, then, that German's colonial policy in Micronesia as elsewhere assumed the national, uniform and effective character which made it noteworthy in the years preceding the World War.

In 1904 the German-Dutch cables connecting with Yap were laid, to be followed by installation of radio-telegraph at Yap in 1913. The phosphate deposits of Angaur (in the Carolines) were discovered and exploited. Government, in fact, encouraged business by an administrative policy far more liberal than that prevailing in the fatherland. It was non-military. The native was protected

THE MARIANA, CAROLINE AND MARSHALL ISLANDS

in a variety of ways from the trader, but he was regarded as legitimate prey for the missionary of Christianity and German culture. In summary it may be said that German administration was surprisingly effective in view of the remoteness of the Islands and their economic poverty.

From the latter the native population has derived its greatest benefits.

CONCERNING the native population (for whose benefit the system of mandates was said to have been created) little of

Natives and
Immigrants

an historical character is known. In the Marianas the principal stock is

referred to as the Chamorros; that of the Carolines and the Marshalls as the Kanakas. Probably the original stock was Malayan, crossed later with Polynesian blood from south-eastern islands of the Pacific. It is today almost a stationary population numbering approximately 50,000, the increase from 1920 to 1935 being about 2000. Economically, the native is a person of few ambitions. In a tropical habitat he is content with the bounty that Nature provides. Industry

JAPAN'S attitude in the administration of Micronesia presents a more intense picture. Regarding the Islands as of great strategic value, the Japanese have set up a government which covers thoroughly the entire mandate. Space is not available here for a discussion of its detailed character: generally speaking, it has proved efficient and humane. In all the major islands educational and hospital facilities now exist.

Japan's
Progressive
Policy



Overshadowed at first by the development of sugar, copra and phosphate, the lucrative fishing industry (bonito and tunny being the principal catch) now employs Japanese workers throughout the islands

in his view is indeed a questionable virtue.

Much more significant than the native population is the Japanese. These immigrants, coming mostly from Okinawa (the Loochoo Islands), now number more than 60,000. They are employed primarily in the sugar industry which the Japanese have developed in the three main islands of the Mariana group: Saipan, Tinian and Rota. In contrast with this immigrant Japanese population, the white population in 1913-14, including Germans, was slightly less than 500.

SINCE the economic resources of Japan's mandate are restricted, its ability to absorb an immigrant population will soon be taxed to the limit.

Developing Resources

Nevertheless, the Japanese are developing the Islands to the full extent of their capacity. Whereas the Germans were content to exploit a little copra and phosphate, the Japanese have developed in addition to these a relatively extensive sugar industry in the Marianas, and the fisheries throughout the mandate. Both the Germans and the Japanese have encouraged industry through imperial subsidies. Between 1884 and 1906 the German government allotted some £150,000 towards administration and development of the Islands. Beginning in 1922, the Japanese government subsidized the administration of the mandate to the extent of £546,875. By 1925 this subsidy had been reduced to £195,000 and by 1930 to £100,000. Since 1932 no direct subsidies have been granted.

THE total value of trade in the last year of the German occupation (1913-14) was £515,000, of which exports amounted to £345,000, imports to £170,000. In 1931 the total value of Japan's trade with the mandate was £1,800,000, of which £1,200,000 consisted of imports from

Japan. During the succeeding four years trade expanded rapidly, and in 1935, the most recent year for which complete figures are available, exports from the mandate were valued at £1,538,494, of which Japan received products to the value of £1,384,936. These products included: sugar, £904,166; phosphate, £126,350; and copra, £99,166. Imports in 1935 were valued at £887,915, of which £852,833 came from Japan. Exports from the mandate to countries other than Japan amounted to £153,533; imports to £35,075.

TO close this brief sketch of a former German colony one may venture a number of conclusions. Japan's task in administering the islands of Micronesia has been in most respects a simple one.

A Life Line for Japan

The land area is small and the native population docile and almost stationary. Resources are so limited that industrial exploitation will very soon reach saturation point. Whereas neither the Spaniards nor the Germans migrated to the Islands, the Japanese have for several years outnumbered the natives. To the Spaniards the Marianas and the Carolines were merely a frontier for Catholic missions; to the Germans they were a minor outpost for trade and for cable communications in the building of a colonial empire. To the Japanese they are much more. In the popular, as well as in the official mind, they are one of the numerous 'life lines' with which Japan seeks to surround herself. Toward them she has adopted a three-fold policy: (1) her administration has on conventional lines been effective and humane; (2) her industrial exploitation has absorbed them completely into her own economic life; and finally (3) she is content to call the Islands a mandate so long as the world in turn is willing to accept in them her exclusive and paternal rule.

PHOTOGRAPHIC NOTES

Edited by F. S. Smythe

22. EXPOSURE EXPLAINED (2)

The brilliance of a source of light is measured in *candle power*, while the illumination on an object or a scene can be estimated in *foot candles*. But neither the brilliance nor the illumination is of so much importance to the photographer as the brightness—or the amount of light reflected from the object to provide the image cast by the lens inside the camera.

In this sense, brightness refers to the amount of light which comes away from an illuminated surface and is equal to the illumination minus that amount of light which has been absorbed by the object. Brightness is measured in units

called *foot lamberts*, and one foot lambert is defined as the brightness of a surface which reflects all the light falling upon it and on which the illumination is one foot candle.

To give an idea of the size of these units it can be stated that a piece of white paper or a white cloth, lying flat on the ground and illuminated by a mid-day summer sun, has an approximate brightness of about 5000 foot lamberts. A piece of black velvet in this same amount of illumination gives an approximate brightness of only 125 foot lamberts. Green foliage illuminated by summer sunshine is not likely to have a brightness of more than 300 foot lamberts, while the trunk of a tree in the shade would give only 20 to 60.

When judging exposure without the aid of a meter, photographers usually divide their subjects into groups. In Group (1) they class the well-illuminated subjects, such as snow scenes, beach scenes and white buildings in the sun. With knowledge based on experience and the speed of the film with which the camera is loaded, a photographer can thus decide which combination of stop and shutter

speed to use when making pictures of this type. From the point of view of brightness, these objects in summer sunshine fall between 4000 and 6000 foot lamberts, so that with a normal fast film $1/25$ th of a second shutter speed and stop f.16 would give fully exposed

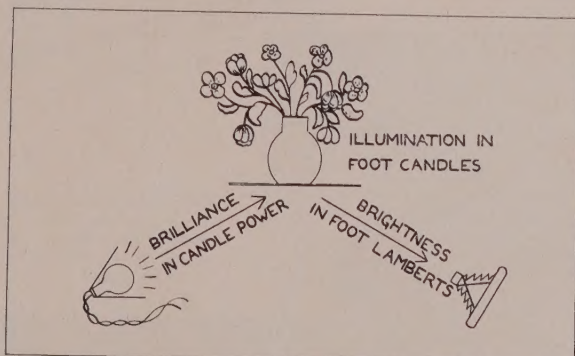
pictures. Faster shutter speeds will, of course, require wider apertures in proportion—*i.e.* $1/100$ th at f.11, $1/200$ th at f.8, etc.

Group (2), which contains landscapes in summer sunlight with grass and trees and a fairly large proportion of sky, lies between 300 to 1000 foot lamberts and should be given an exposure of

$1/25$ th at f.11, or the equivalent. Group (3), which should be given $1/25$ th at f.8, covers dark-coloured objects taken fairly close with little or no sky. This group lies between 10 to about 60 foot lamberts.

The photographer's object is to obtain a correct reproduction of the different degrees of brightness reaching the camera from the original scene. One portion of the scene may record a high degree of brightness, registering anything from 2000 to 4000 foot lamberts; another might give only 300 to 1000, thus creating a total range from 300 to 4000 foot lamberts. A large range naturally makes it difficult to obtain accurate reproduction and the ability to overcome this difficulty is the distinguishing quality of some films and makes one type of material superior to another.

Next month we shall describe how the exposure problem is further complicated by the quality of light with which the photographer is working. Brightness refers to any part of the visible spectrum—no matter what the colour. A film, however, may be more sensitive to one part of the spectrum than to another.



When judging exposure, a photographer estimates brightness, which is measured technically in units called foot lamberts. Illumination, or the amount of light falling on the subject, is measured in foot candles, while the brilliance of the source of light itself can be estimated in candle power.

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